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Device for Raking and Loading Hay.

Painters, poets, and writers on rural subjects, delight to represent the life of the agriculturist as one of almost unalloyed pleasure; the labor is kept well in the shade. Haying, especially, is offered as one of the occupations abounding in hilarity with just enough of the primal curse to give zest to the enjoyment of the work. In this utilitarian age, however, we think that whatever can diminish manual labor and facilitate the work of the farm, bears with it the true poetry. The labor of cutting, curing, and gathering the hay crop is an onerous one, and every device or forwarding the work and diminishing the labor, should be encouraged, or, at least, noticed. The following is a concise description of a combination that appears to promise a diminution of the work of hay making.

Fig. 1

HEARNY'S HAY-RAKING AND LOADING DEVICE.

This invention consists in the combination and arrangement of a series of toothed belts with a hay rake attached to the front of a wagon, for the purpose of raking and elevating hay upon the load. This device it so arranged that the driver can operate and control both the rake and elevator at the same time.

Fig. 1 is a geometrical perspective view of the machinery while in operation, and Fig. 2 is a perspective view of the elevating straps and frame upon which they work. In Fig. 1, A represents the body of the rack; B the frame to which the elevating straps are attached. C is one of the front wheels of the wagon, which is provided with toothed segments, the teeth of which mesh into a corresponding pinion, D, which is secured to the outer end of the lower drum over which the elevating straps pass. E is a rock shaft from which two arms, K K, extend up and receive levers or bars, F F, which are connected to the frame, B. Near the driver's seat is a lever, I, by which he can readily throw the gear wheels in and out of gear, the frame moving in the slots, L. The operation is as follows: As the team is driven across the field, the traction or segment wheel, C, puts in motion the pinion, D, upon the lower arm, which propels the toothed belts. These being located immediately in front of the rake teeth so that the hay is taken by the straps or belts and elevated and deposited upon the load. The hay is held to the teeth of the straps by means of other straps passing down in front of the elevating straps. The rake is operated as a hay tedder, spreading the hay loosely and evenly upon the ground.

Fig. 2.

by means of the curved brace, A, or lever. By detaching the wagon box the front portion may be used

Patented through the Scientific American Patent Agency on May 29, 1866, by A. W. Hearny, to whom apply for further information at Doylestown, Pa.

Healthful Effects of the Tomato.

The tomato is one of the most healthful, as well as the most universally liked of all the vegetables. Its healthy qualities do not depend on the mode of preparation for the table; it may be eaten three times a day, cold or hot, cooked or raw, alone, with or without salt, or pepper, or vinegar, or altogether to a like advantage, and to the utmost that can be taken with an appetite. Its healthful quality arises from its slight acidity, in this respect as valuable, perhaps, as berries, cherries, currants, and similar articles; it is also highly nutritious. The tomato season ends with the frost. If hung up in a well-ventilated cellar, with the tomatoes hanging to the vines, the "love apple" will continue to ripen until Christmas. The cellar should not be too dry nor too warm. The knowledge of this may be improved to great advantage for the benefit of many who are invalids, and who are fond of the tomato.

PETROLEUM lubrications do not seem to be the right thing. The Union Mills of Fall River, Mass., have just had 6,000 cases of calicoes thrown back on their hands, damaged by petroleum oil, which was used as a lubricator on the looms, and spattered on the cloth. All the washing and bleaching the fabric was subjected to at the print works failed to eradicate the petroleum and the consequence is a chemical "spotting" effect on the colors.

RECENT PHOTOGRAPHIC IMPROVEMENT.

Dr. Angus Smith, of Manchester, England, has lately communicated to the Photographic Society of Scotland, a process for removing the last traces of hyposulphites from photographic prints, and thereby rendering them entirely permanent. This he accomplishes by the use of peroxide of hydrogen, which converts the hyposulphites into sulphate, which latter are innoxious and soluble salts. The discovery seems to have made quite a stir among photographer on the other side the Atlantic. The *British Journal of Photography says*:—

"From the experiments which we have already made, we feel justified in asserting that no contribution toward the improvement of photographic silver printing, since the introduction of alkaline toning, is comparable in importance with that which we announced and partially described in last week's *Journal*. Dr. Smith, although, we understand, not a practical photographer, has done the art great service.

"It needs no experimental proof, at the present day to show that hyposulphites are the primary cause of the fading of photographic prints. We have been long ago conscious of this, and have been devising every sort of possible and impossible means of getting rid of them, without, however, having achieved all the desired success. We know, unfortunately too well, how the least trace of hyposulphite of soda left in a silver print, slowly but surely entails its destruction, by forming, with the silver, another very unstable hyposulphite, which is rapidly decomposed into sulphide of silver and sulphuric acid. The jaundiced appearance of such prints is but too familiar to every one, and their sudden transition into the "sere and yellow leaf" has done more to lessen the public estimation of photographic work than all other causes put together. Hence it is of the utmost consequence to the full development of our art to annihilate, once and for ever, our treacherous friend in need, hyposulphite of soda, as soon as it has fulfilled its useful mission, otherwise we shall find it our bitterest foe.

"It is very doubtful whether any amount of washing in cold water will remove the last traces of hyposulphite of soda from the texture of the paper on which the print is impressed. The hyposulphite seems to be so entangled with the size that without removing the one we cannot succeed in entirely getting rid of the other by mere ablution. But if, by the method suggested by Dr. Smith, we have it in our power to convert the noxious hyposulphite into an innoxious compound, namely, the sulphate, our whole process is accomplished; for be it observed, a particle of hyposulphite of soda may be locked up in a position from which water cannot displace it, but still, like other substances, it is suitable of chemical decomposition *in situ* by a susceptible reagent placed within chemical contact. This fact is well known, and it constitutes the whole sum and substance of Dr. Smith's discovery. We shall presently show that peroxide of hydrogen possesses, in a remarkable degree, the desired property of converting hypozulphites into sulphates. For this reason it must henceforth take the position of an indispensable chemical in the photographic laboratory.

"*Peroxide of hydrogen* (HO_2) is a very singular compound, discovered by Thenard in 1818. The method of preparation is so elaborate and complicated that we need only just sketch its outline here. Very few photographers or even chemists are in a position to prepare it economically for themselves; indeed, we only know one firm in London which has hitherto manufactured it commercially, and that apparently for medicinal purposes. It is produced when the peroxide of barrium, sodium, or potassium, etc., is acted on by any diluted acid which forms a soluble salt with the base. Peroxide of barium is generally employed. When it is dissolved in hydrochloric acid and water the excess of oxygen does not escape, but is absorbed by the water which it converts into peroxide of hydrogen. The protoxide of barium in solution is then precipitated by means of sulphuric acid. After filtration the same process is again and again repeated, until the water becomes saturated with oxygen. The solution is then purified by eliminating from it the excess of acids and of dissolved salts, and that is done by a long and troublesome series of operations.

"Peroxide of hydrogen is a powerful oxidizing agent, and it is in virtue of this property that its value will henceforth be recognized in photography.

It converts many of the protoxides into higher oxides, and several acids—the hyposulphurous, for instance—into those of a higher class. Dr. Smith's announcement that it converts hyposulphite into sulphate of soda, can easily be proved to be true; but we shall only here give the following striking experimental illustration of the fact, which any photographer can test for himself with the ordinary chemicals at his disposal.

"Dissolve in a wine glass any quantity of sulphate of soda, and add to the solution a few drops of tincture of iodine. The solution will remain permanently discolored, showing that sulphate of soda does not dissolve iodine. In another wine glass half filled with plain water, drop sufficient tincture of iodine to strike a permanent dark sherry color throughout the liquid; then add drop by drop a weak solution of hyposulphite of soda till the color is discharged, taking care to add as little excess of hyposulphite as possible. So far this experiment shows that iodine is soluble in hyposulphite of soda. Now fill up the glass with an aqueous solution of peroxide of hydrogen, and observe the effects. After a few minutes the iodine is no longer held in solution, and the liquid will resume the dark sherry color it had before adding the hyposulphite of soda. The explanation is as follows:—The hyposulphurous acid (S_2O_2) combined with the soda has been oxidized by the peroxide of hydrogen, and has passed into a higher sulphur acid, the sulphurous (SO_2), and then sulphuric (SO_3), still holding the same base (soda) in combination; and this salt, whether sulphite or sulphate of soda, we have seen, does not dissolve iodine. Moreover, it has no injurious action on photographic prints, even if left to dry in the interstices of the paper.

"The best method of applying peroxide of hydrogen to the prints will readily suggest itself. After they have been thoroughly well washed, so as to be cleared of all except the mearest trace of hyposulphite of soda, immerse say fifty of the card size in a quart of water containing one ounce of ten-volume strength of peroxide of hydrogen, and let them soak for an hour. One ounce of this solution contains (besides the oxygen, which is a necessary constituent of the water, and which is not available) ten ounces of volume of oxygen, which it is ready to part with to the hyposulphite, and thus convert it into a sulphite or sulphate. Perhaps a less proportion than this might be sufficient for the purpose, but it will require more extended experiment than we have as yet been able to bestow on the subject to determine the approximate proportions."

Scientific Steel Pens.

These pens are manufactured upon an entirely new principle, the inventor having discarded the quill shape as being unfit for a metallic pen, and made this pen with three arches or corrugations, the two corrugations on the back acting in opposition to the forward arch or bowl of the pen, thereby rendering and keeping the points or nibs square together, which enables the pen to glide over the paper without any fear of catching. These pens are also covered with a solution which prevents them from corroding.

With this pen is connected a new ink-retaining penholder. This pen holder has been invented expressly to hold a quantity of ink near the point of the pen, and is extremely useful to the penman, when using very thin or limpid ink. This improvement is effected by a blade or tongue, which slides in the inside of the holder, and can be drawn in or out at the option of the writer. For further information, address Wm. B. Stimpson, No. 37 Nassau street, Room 8, New York.

An aerial navigation society has been organized in London for the purpose of pushing forward the interest of their science, hoping thereby to rescue it from ridicule and preposterous caricature. The secretary of the society regards the balloon as a fulcrum from which with comparative safety a man may learn to fly as easily as he can learn to swim with a cork jacket. No one can deny this statement, but the great question to be determined is, can the balloon be made serviceable for purposes of navigation?

OUR SPECIAL CORRESPONDENCE.

Trial of Breech-loading Rifles for the Army.

WASHINGTON, May 22d, 1866.

The SCIENTIFIC AMERICAN has for several years urged the manifest superiority of breech-loading rifles for infantry soldiers over the muzzle-loading small-arms, and the experience of the last war pretty fully demonstrated the soundness of these views. This experience having determined our military authorities to adopt breech-loaders for infantry rifles as well as for cavalry carbines, a commission was appointed last year to make a series of trials of all breech loading rifles that might be offered by their inventors for competition, in order to select the one which should prove to be best adapted to army use. The trial was made at Springfield, Mass.; some sixty inventors submitted their guns for competition, and the result was a report giving the preference to the Peabody rifle. A second commission was then appointed, with Major General Hancock at its head, to make another trial in this city; that trial is now going on, and I made it my business yesterday to learn the manner in which it is conducted.

The commission is composed of the following named gentlemen, all officers of the United States Army:—Major Gen. Hancock, President; Brevet Major Gen. Buchanan; Brevet Brig. Gen. Hagan; Brevet Brig. Gen. Griffin; Brevet Col. Benton; Brevet Col. Porter; Brevet Lieut. Col. Owens; Brevet Lieut. Col. Parsons, Recorder.

I found all but two of these officers dressed in civilian's clothes while engaged in this duty. Major General Hancock is a stout, powerful-looking man, and impresses you as being the incarnation of force. He looks as if he would go through or over anything that might stand in his way. He is one of the born leaders of men, and is in exactly the right place, as the commander of armies. General Griffin looks like a Southerner—one of that considerable number of our West Point officers who have resisted the most subtle, seductive, and powerful temptation that ever drew a soldier from fidelity to his flag. Col. Benton is a short, thick-set, vigorous-looking officer; but the soul of the commission is Lieut. Col. Parson, the Recorder. He is a young man of light complexion, clear eye, loud voice, prompt military manners, and courteous address. The whole commission is a most perfect tribunal for the decision of the question submitted to its arbitration. With large experience and thorough understanding of the problem to be solved, with the consciousness that their award will be subjected to the intelligent and impartial criticism of all army officers, not only in this country, but throughout the civilized world, their decision, after their long-continued and laborious trials, must be accepted as of the very highest authority.

To illustrate the number of considerations to be taken into account in making the selection, General Hagan showed me one of the guns submitted for trial, the breech of which opened with a gate swinging on a hinge. When the cock was down—the only position in which it could be when the gun was discharged—the gate was securely closed, but when the gun was cocked the gate was very easily opened. Gen. Hagan said that the consciousness of this had an unfavorable effect on the mind and nerves of the soldier, causing him to shrink in firing the weapon.

The following rules have been published for the guidance of inventors submitting their guns for trial:—

PROGRAMME FOR BOARD ON BREECH-LOADING ARMS.

I. Each arm will be taken apart by the inventor, or his agent, and its construction and operation fully explained to the Board. At the same time a written description of the arm, setting forth its special merits, patent claims, etc., should be furnished for the records of the Board.

II. After a suitable number of arms shall have been examined, the Board will proceed to the Arsenal and test their working qualities, and for this purpose each gun will be fired by the person submitting it not less than one hundred times.

III. After all the arms have been submitted to this preliminary examination and test, the Board will select those deemed most suitable for the military service, and subject them to further test, in the hands of soldiers, by firing for range, accuracy, penetration, and rapidity, and for strength and endurance by firing increasing charges.

IV. The question of caliber will be determined by the Board after due consideration of the experiments made by this and foreign Governments on this subject. The Board, however, will verify, by actual trial, the conclusions arrived at.

V. Each person will state, in writing, the lowest price at which his arm will be furnished by himself, or the

rate per thousand at which he will allow the Government to make them. These proposals will be made separately on forms to be furnished on application, and will be directed, sealed, to the Recorder of the Board, and endorsed "Proposals for furnishing Breech-loading Arms," and will be opened at such time as the Board may direct.

After the hundred rounds fired by the inventor, the gun is taken by the Board, and without being cleaned, is fired first to test its strength. The powder used is fine-grained rifle powder. The gun is fired first with 65 grains of powder and 2 bullets, then with 70 grains of powder and 3 bullets, then with 75 grains of powder and 4 bullets.

It is then fired for accuracy at 200, 500, and 1,000 yards. In firing for accuracy the arm is secured in a clamp which has a sliding motion on ways to permit the recoil. The test for penetration is made by firing through a number of white-pine boards placed an inch apart, and each an inch in thickness; they are placed at a distance of thirty yards from the gun.

Among the inventors who were present to explain their guns to the Board were Governor Jackson, of Rhode Island, formerly of the Burnside Rifle Company, Dr. Maynard, of New York, and other gentlemen who had made the rifle, and especially breech-loading rifles, the subject of long study and experiment. The only objection made by these men to the trials was the extreme severity of the test for strength to which the guns are subjected. Governor Jackson said that the test of firing with four bullets was first adopted in examining the old muzzle-loading musket, on the ground that the soldier, in the confusion of battle, was liable to load his gun three or four times without firing it; but as it is impossible to get more than one charge into a breech-loader, he did not see the necessity of so severe a test for this style of arm. The reason assigned by the Board for this test is that cavalry carry their carbines with the muzzle down, and it is liable to become filled with mud. In reply to this, Governor Jackson says that if the muzzle is closed with mud, the barrel will burst, whatever the strength of the breech; he has tried the experiment of closing the muzzle with a cork, and the gun always bursts at the muzzle.

The inventors present seemed all to agree that no good shooting could be done by fastening the gun in a clamp; the proper way being to have a good double rest, and fire from the shoulder. I also put in the suggestion that for firing with any accuracy 1000 yards, a telescope is essential. No man can tell at this distance, by looking with the naked eye through the open sights of a rifle, whether the piece is, or is not, pointing at a barn door. In a trial for skill among rival riflemen, I approve of firing off-hand and with open sights, but in testing the gun, all errors of aim should be eliminated if possible.

When among men familiar with the subject, I always raise the question of the comparative accuracy of breech, and muzzle loaders. I found the men here all to agree that a good breech-loader is even more accurate than the American target rifle. Dr. Maynard said that Cyrus Bradley, of Otsego Co., N. Y., was ready at any time to bet that with his breech-loader he could beat any muzzle-loader, the barrel of which was not heavier than his entire gun. For this accuracy Dr. Maynard insists on the condition that the cartridge shall be of the right material, and shall be properly designed and made. Then, he contends, the axis of the bullet may be made to coincide more exactly and more surely with the axis of the barrel, than by swedging through Clark's false muzzle. I am now pretty well satisfied, though not fully, of the correctness of this position, and if it is sound, there can be no doubt that breech-loading rifles will rapidly supersede muzzle-loaders for sporting purposes, whatever may be the decision in regard to the army. A serious drawback from the pleasure of rifle shooting is the great amount of greasy and filthy labor in cleaning and loading the gun after every discharge. This is nearly all avoided in the breech-loader, and will be entirely avoided when inventors succeed in producing a cartridge that will effectually clean the gun at every fire.

G. B.

WEIGHTS AND MEASURES.

THE METRIC SYSTEM AND ITS EQUIVALENTS.

The bill passed by the House of Representatives to authorize the use of the metric system of weights and measures—now pending in the Senate—provides that the following tables shall be recognized in contracts and legal proceedings as the equivalents of the weights and measures of the metric system: Any apparent complexity of the system will disappear when it is observed that it depends upon a single unit—the meter—and that any denomination of measure can be expressed in meters, square meters or solid meters. The gram is the weight of a cube of water a hundreth of a meter on each side. For ordinary uses the words meter and gram are the only new words to be learned.

It should also be noticed that although the weights and measures are in value precisely the same as those used in Europe, the names have been so changed as to accord with the spirit of our language.

MEASURES OF LENGTH.

Metric Denominations and Values.	Equivalents in Denominations in Use.
Myriameter.....10,000 meters.	6·2137 miles.
Kilometer.....1,000 meters.	0·62137 miles, or 3,280 feet and 10 inches.
Hectometer.....100 meters.	328 feet and 1 inch.
Dekameter.....10 meters.	393·7 inches.
Meter.....1 meter.	39·37 inches.
Decimeter.....1-10 of a meter.	3·937 inches.
Centimeter.....1-100 of a meter.	0·3937 inches.
Millimeter.....1-1000 of a meter.	0·0394 inches.

MEASURES OF CAPACITY.

Names.	Number of Liters	Cubic Measure.	Dry Measure.	Liquid or Wine Measure.
Kiloliter, or stere	1,000	1 cubic meter	1·308 cubic yards.	264·17 gallons.
Hectoliter	100	1-10 of a cubic meter	2 bushels and 3·35 pecks.	26·417 gallons.
Dekaliter	10	10 cubic decimeters	9·08 quarts.	2·6417 gallons.
Liter	1	1 cubic decimeter	0·908 quarts.	1·0567 quarts.
Deciliter	1-10	1-10 of a cubic decimeter	6·1022 cubic inches.	0·845 gills.
Centiliter	1-100	10 cubic centimeters	0·6102 cubic inches.	0·338 fluid ounces.
Milliliter	1-1000	1 cubic centimeter	0·061 cubic inches.	0·27 fluid drams.

EQUIVALENTS IN DENOMINATIONS IN USE.

METRIC DENOMINATIONS AND VALUES.

WEIGHTS.

Names.	Number of Grams.	Weight of what quantity of water at max. imum density.	Avoirdupois weight.
Millier, or Tonneau	1,000,000	1 cubic meter	2,204·6 pounds.
Quintal	100,000	1 hectoliter	220·46 pounds.
Myriagram	10,000	10 liters	22·046 pounds.
Kilogram or kilo	1,000	1 liter	2·2046 pounds.
Hectogram	100	1 deciliter	3·5274 ounces.
Dekagram	10	10 cubic centimeters	0·3527 ounces.
Gram	1	1 cubic centimeter	15·432 grains.
Decigram	1-10	1-10 of a cubic centimeter	1·5432 grains.
Centigram	1-100	10 cubic millimeters	0·1543 grains.
Milligram	1-1000	1 cubic millimeter	0·0154 grains.

MEASURES OF SURFACE.

Metric Denominations and Values.	Equivalents in Denominations in Use.
Hectare.....10,000 square meters	2·471 acres.
Are.....100 square meters	119·6 square yards.
Centare.....1 square meter	1,550 square inches.

It is intended to start the *Great Eastern* on her second attempt to lay the Atlantic cable July 1st.

EDUCATION OF WORKINGMEN.

The grand movement now on foot, confined to no particular section of the country, for the reduction of the hours of labor, urges, among the best reasons for its success, that of giving the workingman more opportunities for mental culture. Without arguing either for or against the claim that the two hours thus proposed to be taken from each day's labor will be employed, even partially, in study, there is an obvious need for a better mental and theoretical education among our workingmen, especially mechanics. Those departments of industry are the best paid and highest valued into which enters most of the intellect—the brain labor.

The expertness necessary to guide the machinist's drill, turning chisel, or planing tool, to use the file or the cold chisel, or to wield the blacksmith's hammer, necessitates only a certain amount of practice; but above this animated machine, working under another's will, there is a position where guiding, and managing, and controlling brain exerts its wonderful power. Still further we may look and see the scientific mechanic and the inventor, one the trusted and trustworthy means of achieving works which are destined to benefit coming generations, and the other a genius who, more than diplomats or statesmen, guides and controls the destinies of nations. These grades between the laborer and the thinker are necessary and will always exist. Machinery, well called "labor-saving," will more and more infringe upon the province of the muscle user, although it may never entirely dispense with his services. It cannot, however, more than trench upon the boundaries which defend the brain user; his position is one of comparative security.

Arguing from these premises, what ought to be the object of our delvers, our laborers, our musclemen? Evidently to qualify themselves to ascend another step on the ladder of improvement. Education of the reasoning faculties is the only means to that step; not book knowledge merely, but that alertness and discipline of the mental powers which is stimulated by study and maintained and strengthened by observation and practice.

Take a familiar example of the advantage of a knowledge of principles and the proper application of them to practice. A workman in a machine shop is required to cut on a shaft a thread of perhaps eight to the inch; the chart attached to all modern screw-cutting lathes gives him the gears for the spindle and the leading screw. The result is the required thread. But why? Somebody, he who planned the lathe, knew; why not he who uses it? How easy to know! The rules of arithmetic which enables the workman to calculate his wages by the day, the week, the hour, applied to this matter, would explain all. Suppose the leading screw which guides the cutter to be of a pitch of two to the inch; if it revolves at the same rate as the shaft to be threaded, the result will be a duplicate of the leading screw. But he desires to make four threads on the shaft to each thread on the screw. It is evident, therefore, that the latter should revolve only once, while the former rotates four times. Now the way is clear. If he places upon the spindle a gear of forty teeth that on the screw must contain just four times as many, or one hundred and sixty. So with any gear first selected, the proportions must be as four to one.

Simple as is this philosophy of relative motions, thus familiarly illustrated, it is well known that many machinists have never given it a thought. And it is a shame to some mechanics that they do not care to know "the reason why," but are content to worry through their week's work and receive their week's wages without having gained one iota of additional knowledge, beyond the mechanical expertness inseparable from constant practice. No appeal to professional pride or personal ambition can be of value to such men.

To the ambitious workingmen, of whatever branch of industry, we appeal to use their opportunities. A single half hour out of the twenty-four, devoted earnestly to the study of some department of knowledge applicable to their particular business, will result in one short year—if the mind is active to make application of the knowledge by observation and experience—in an improvement which will astonish them. They will notice it in an increasing interest in their work; what was before a distasteful drudg-

ery becoming a pleasant employment. They will see it in an increased appreciation of their services by an intelligent employer; for nothing is more annoying to an employer, manager, or foreman, than to be compelled to watch every movement of his workmen, from the fear that the job may be retarded, injured, or ruined. They will feel it in the growing consciousness of increasing independence, in the certainty of employment in dull times, in the opportunities for advancement, and in their fitness for higher and better positions.

MONITORS IN ENGLAND.

Our English exchanges continue to discuss the monitor question at great length. The *Engineering*, Mr. Colburn's new paper, and the *Engineer*, treat the matter by correspondence, by the burin of the engraver, and by leaders. Mr. John Bourne, whom all the engineering world is well acquainted with through his works, openly advocates them, and argues in their favor, condemning in strong terms those antique ships with top lofty sides and thin armor which constitute the naval force of European nations.

It must not be inferred that monitors meet with favor on all sides. Quite the reverse. The *Engineer* declares that "such ships as the *Dictator* are unseaworthy and objectionable as cruisers in every respect. Even Americans admit the fact. We must, in short, have free board. Of what should it consist? Of vessels of moderate size, apparently of thin, tough plates of the best possible iron, say three-fourths of an inch to seven-eighths of an inch from the upper edge of the armor plating up say twelve or fourteen feet;" and the editor goes on to say that this thickness of metal would not offer sufficient resistance to explode a fuseless shell, and that splinters dislodged by bullets and round shot would not do much damage to the crew if mantlets of rope or hide were suspended in-board. The *Engineer* also says it would appear that on the whole ships with unarmored upper works are safer than those with imperfect armor—a laborious conclusion to arrive at in a leading article of a column and a-half.

"Three wise men of Gotham went to sea in a bowl; if the bowl had been stronger this song would have been longer", and that is the predicament of our British friends. Two horns of a dilemma are presented, but they are both sharp and unpleasant: Either they must abandon the monstrous ironclads they have constructed at such immense outlay, and build others on approved plans, such as the monitors, or lose their boasted supremacy on the sea in case of a naval war.

On the whole, it is inferred by the journal which claims to lead in matters of this kind, that armored ships are of no particular utility when they are fourteen or fifteen feet out of water. No one familiar with the performances of our vessels would dispute this statement. We are quite well satisfied with the performance of our ironclad fleet, and the comments of the English press strengthens our confidence.

SALT AND SODA.

The *Tribune* of the 29th ult. records the fact that within the last ten days soda ash has gone up half a cent a pound, and laments that "there is not a single living, kicking, soda-ash factory in all our country." Although the *Tribune* is slightly mistaken about the existence of soda-ash factories in the United States; yet its complaint that we are dependent upon foreign countries for soda ash is well founded. The American soda ash is manufactured only incidentally or accidentally, and is so small in quantity that it does not affect the price or the consumption of the article. It is made here simply to use up materials about acid factories which otherwise might be wasted.

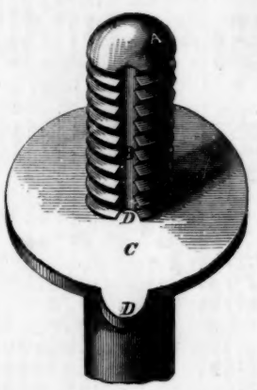
The present obstacle to the manufacture of soda here is the want of cheap salt; in this country salt costs eight or ten times more than in England. The other raw materials needed, sulphur, coal, and manganese, we have in great abundance, in fact, we are more favored than any other country. But there is plenty of salt in the sea, and we have plenty of places like the Jersey flats which might be used for its extraction.

Some of our readers may ask "what of it?" and "what is soda ash to us?" The soda ash manufacture implies more extensive manufacturing establishments than now exist on the continent. It does not concern soda ash alone, for about it clusters, as of necessity, the manufacture, at the same time, of acids, bleaching powder, and hyposulphite of soda.

Some of our most important arts are built on soda ash. Without it, no soap, no glass, no white paper. If the supply of soda ash should be interrupted for six months, what would become of us? As we have suggested above, our salvation, would be salt. The American people cannot do any thing more profitable than to find us salt for ten cents a bushel.

HICKMAN'S IMPROVED WASHER.

The annexed engraving represents a bolt with a longitudinal slit, and a washer with two lips, one of which enters the slit in the bolt and prevents the revolution of the washer, the other being bent up against



the nut to prevent the latter from becoming loosened. The object is to prevent the loosening or loss of nuts or burrs where exposed to jar or tremulous motion, and in many places will answer a very desirable purpose. Patented May 29, 1866, through the Scientific American Patent Agency, by G. G. Hickman, Coatesville, Pa., to whom address for further information.

How American Velvet is Made.

The machinery for the manufacture of American velvet was introduced into this country by the inventor, a Mr. Holt, of Cheshire, England, and its superiority in the matter of rapidity is said to be as great as that of the modern railroads over the old stage coach system. The method is as follows:—Grooved brass rods or wires were placed under the web which forms the pile, secured by threads woven into the warp. The weaver cuts the threads by means of a knife, held in the hand, the blade of which slides along the groove, dividing the pile into two rows of threads, thus giving a nap or pile of the depth of the rod inserted.

The manufacture, according to the patented method, is accomplished by weaving two warps or foundations, with a middle warp alternately rising into the upper and lower, being secured by two shuttles moving at once. The knife moves horizontally, in the same direction as the shuttles, and the two warps and the pile between are divided, and the naps are cut into equal lengths. Two piled fabrics—the exact counterpart of each other—are thus made at one time. The shuttles and knives are all impelled by the ordinary motions of the power loom.

The statement that 110 picks or threads are made in a minute (or nearly two every second) will give some idea of the rapidity of the manufacture. A man with a patented machine can make from fifty to sixty yards per week, while eight or ten yards would be a good week's work for the same person should he make use of the ordinary hand-loom. The saving of labor by this process over the wire-weaving method is estimated at from fifty to seventy per cent., while the fabrics are equal, and, in some respects, superior to those of foreign make. The looms are adapted to the manufacture of piled fabrics, such as silk plush, since an article of this nature for gentlemen's caps has become very popular as a substitute for fur. Tartan, or clan velvets, are also made.—*Commercial Bulletin.*

Stamp Your Receipts.—The importance of stamping receipts was recently determined in this city in a suit against a party who neglected to attach the required two-cent revenue stamp to seven receipts. The fine for such neglect is $200 for each and every offence, and the party sued was fined $1400. The example is worthy of remembrance.

An Extensive Salt Mine.

The New Orleans *Times* gives an extended account of what it considered the purest and most important natural deposit of salt in the world, located on the coast of Louisiana at Petit Anse Island. The deposit was known as early as 1698-99, out all knowledge of it appears to have been lost until after the commencement of the recent war. During that period, when the supply from other sources was cut off, the mine was discovered by residents of the interior who had resorted to the island for the purpose of procuring salt by boiling, and for two years nearly the whole of the trans-Mississippi region was supplied from that source, no less than two thousand pounds having been taken from it in three months. When the island passed into the hands of the Federal forces, the works, buildings, etc., were destroyed, but it has recently been purchased by New York capitalists, who, in developing the property, have found the salt rock from thirteen to twenty-two feet below the surface, extending over a great number of acres. Pits of over forty feet in depth have been sunk through the salt without finding any indications of reaching bottom. The salt formation is almost perfectly pure, chemical analysis showing that it contains about ninety per cent pure salt. The development of the property is being rapidly pushed, and the product has already reached two hundred thousand pounds per week, with a force of ten hands. This mine is regarded as forming a prominent part of the material resources of Louisiana.

Estimates about the Cotton Crop.

A good deal of interest is manifested in the probable amount of the cotton crop for 1866. Some writers have estimated it as high as 2,500,000 bales, but a correspondent of the Vicksburg *Journal*, who has recently visited several counties in different sections of the State, estimates the cotton crop at a fraction less than 1,500,000 bales.

A letter from Georgia, recently published, says:—

"The cotton crop of 1860 was 5,000,000 bales, which brought into the Southern States $175,000,000. Southwest Georgia produced 110,000, receiving $3,500,000. The crop of the current year will range somewhere about 1,200,000, and south-west Georgia will yield at least 90,000 bales; hence, if cotton commands 25 cents per pound next fall, this favored section will obtain nearly $12,000,000, and consequently will be, by long odds, the richest district south of the Potomac. This country suffered comparatively nothing from the war; no enemy penetrated into this portion of the State; labor was uninterrupted; property was not destroyed or wasted, and a greater quantity of first-class land is now in cultivation than in 1860; and lastly, the planters are turning their attention exclusively to the production of cotton.

"In the present disordered state of Southern society, it is almost impossible to collect sufficient reliable data to ground an estimate upon, and I freely confess I am not able, by reasoning, to maintain the figures made elsewhere; but this we do know, an immense tract of our cotton-growing region is now idle, and that numbers of what were formerly most productive plantations, are now being worked with one-half of the customary force. Some of the papers say that the crops will be diminished one-third from this cause alone. Then there are three other causes operating in this direction—the scarcity of mules and horses; the scarcity of cotton seed; and the scarcity of labor."

How to Cure a Felon.—As we often see friends suffer with these very troublesome things, we publish the following cure for them, which we have heard highly recommended:—As soon as the parts begin to swell get the tincture of lobelia, and wrap the part affected with cloth saturated thoroughly with the tincture, and the felon is dead. An old physician says he has known it to cure in scores of cases, and it never fails if applied in season.—*Journal of Medicine.*

Prize for an Invention.—The French Government has issued a decree, published in the *Moniteur*, by which a prize of 50,000 francs, or $10,000, is to be awarded, within the next five years, to the person who shall discover a system by which the voltaic battery can be economically applied to heating or lighting purposes.

Correspondence

Ancient War Implements.

MESSRS. EDITORS:—I am not familiar with the history of the experiments and improvements in artillery, only having read somewhere, when a boy, that the first cannon was made of leather and the first balls of stone; and having a distinct opinion, during our late war, that grape out of smooth bore batteries at short range, would, upon an average, do more work than single bolts fired from rifled guns at ranges of one to five miles. But I have been under the impression that the advocates of the breech-loading system claimed it as a modern invention. Am I right or wrong in this supposition? There are, in the Museum of Northern Antiquites, at this place, two pieces of breech-loading ordnance, taken from a wreck in neighboring waters, which are at least three hundred and fifty years old. The guns are of wrought iron, and the workmanship is evidently that of welding one flat ring on to another, which I had also taken to be quite a modern idea. I have heard it said that there is a pretty good pattern for a Colt's revolver in an old collection in Germany, but for this I cannot vouch.

The hatchets and arrow heads of the stone period found in the north of Europe, are many of them of the same pattern as those found all over the United States; the arrow heads being of inferior, and the flint knives and spear heads being of superior workmanship to any I ever saw in America. Did the inventive powers of savages run by necessity in the same channel in different continents? or were the patterns of these instruments and the unknown art of fashioning the hardest of stones inherited by tradition from the original diverging kindred families in Asia? Does the shape of implements of hunting and of war throw any light upon the question of the first peopling of America? From the bronze period there are in the same Museum specimens of curious spiral war trumpets cast in one piece, a work which it is said could not now be done any where but in Japan. Is this true that savages could cast metal into forms which a Yankee cannot, or is it only the innocent enthusiasm of an honest antiquary?

Y.

Copenhagen, Denmark, May 5, 1866.

[In reply to our correspondent we would say that his comparison between the smooth-bore guns firing grape, and the rifled guns discharging bolts, is based upon a wrong theory. One is intended for one purpose and the other for an entirely different one. Discharges of grape, from smooth bore guns, upon bodies of men at short range, is one of the most destructive agencies of warfare. Balls, bolts, or shells are rarely used at short range, from rifled guns, unless to pierce the sides of ships or breach the walls of fortifications. The object of the rifled bore is to obtain greater range and accuracy.

Breech-loading cannon are probably as old as any style of guns. It is difficult to assign the precise date to their use, but Benton in his "Ordnance and Gunnery" says: "Among the earliest cannon are found those which were loaded at the breech instead of the muzzle. One of the earliest methods was that of having a rectangular, horizontal opening at the breech to receive a sliding chamber containing the charge, the block being held in its place by a key inserted from the top of the piece."

The Colt's revolver, or rather the principle of its operation, is by no means modern. We have heard Col. Colt, himself, acknowledge this. At the time he invented his revolving arm he did not know that he was reviving one of the lost arts. Subsequently, however, he obtained a specimen of rude workmanship, which we believe dated back to the sixteenth century. The barrels or chambers in this machine were revolved by hand.

The similarity of the rude stone weapons and implements found in the north of Europe to those found on this continent, does not, in our opinion, argue a consanguinity of races or mutual intercourse. The same necessities of men in one locality would urge them to the adoption of similar means, to provide for those necessities, as those adopted by other tribes, however far removed; for God made of one blood all the nations that dwell upon the face of the earth. The spear, the bow, flints for arrow heads, and other articles, have been found indiscriminately among the savage tribes of all parts of the world, and in all ages.—EDS.

Crytography.

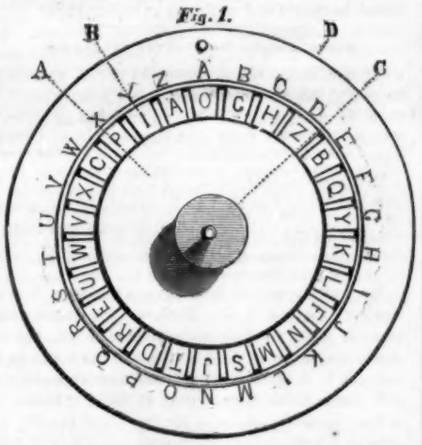
MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of May 5th appeared a very interesting article on cipher writing, and it struck me that a description of a little instrument I invented during the war, for producing unlimited numbers of cipher alphabets, might not prove uninteresting to the readers of your journal, especially as the Chief of the Signal Corps of the U. S. Army ordered fifty of the instruments, and for all I know, manufactured his ciphers during the war by them. They were never patented, and the Government received them at cost price.

With regard to ciphers, it will be well to remember, that owing to the constitution of our language, a given number of words will contain the same letters repeated a certain number of times, so that there is no cipher, however complicated, which, if used for any length of time, cannot be discovered, the clue being the repetition of the signs.

Besides this, a cipher cannot be produced without the effort of thought, *except mechanically*, and it is safe to conclude that what one mind can conceive another mind is capable of tracing out.

Having these considerations in view, during the first year of the rebellion, I set myself the task of producing a pocket apparatus which would be capable of producing ciphers perpetually without mental effort, and therefore without mental bias or sequence; thus the operator being able to produce 365 ciphers as easily as he before could make one, had no inducement to repeat the same cipher twice over; and as the little pocket disk in its operations followed no bias or rule, depending entirely on *chance* for its changes, the chances were very great against any discovery being made without the key in the possession of each communicating party.

Fig. 1.



The instrument consists of a brass disk, D, about the size of the illustration (Fig. 1), upon which an alphabet was indelibly stamped in a circle. Within this circle of fixed letters there was another circle of movable ones, B, fitting into little recesses opposite each fixed letter. The movable letters are represented separate from the disk in Fig. 2.

Fig 2.

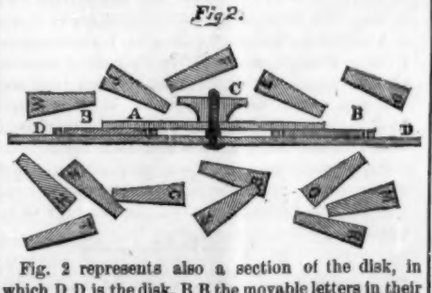


Fig. 2 represents also a section of the disk, in which D D is the disk, B B the movable letters in their recesses, held in place by the circular plate, A, and the nut, C.

To illustrate the mode of using the disk: suppose the movable letters to be put into the disk—the A opposite A, B opposite B, and so on, each fixed letter with a corresponding movable one opposite. We now wish to make a cipher—turn the disk over on the table, the letters will fall out with their faces downward. Now mix them up like a set of dominoes, and replace them at random in the disk; screw the cap down upon them, and the cipher is ready. Probably such an arrangement of letters as represented in Fig. 1 may be the result.

You wish to telegraph to headquarters "Early has entered Pennsylvania," it would not be necessary to use all the letters; you would use, say, EARLY HS ENTD PNSLVA. To transmit this by the disk as arranged in Fig. 1, you would use BOEMIRUBJWZ DJUMXO.

The system recommended was to form, by means of the disk, 37 ciphers, numbered 1 upward. Copies of these were to be furnished to each of the signal officers, with instructions to change every ten days. This afforded ciphers for a year—the date upon which the cipher was transmitted indicating at headquarters the arrangement or key to be consulted in translating, and *vice versa*—the disk being set according to the copy served as the key, and was always at hand. If any of the copies were lost, headquarters were to be at once apprised of the fact, so that a new set of ciphers might be manufactured. Thus, to produce a new cipher, the time only is required necessary to unscrew the nut, upset the movable letters, and replace them at random—the mind has no part in it; therefore, if not used too often, it will be impossible, by any rule, to find out the cipher in time to make use of it.

J. WYATT REID, Consulting Engineer.

New York City, May, 24, 1866.

The European Naval Excursion.

MESSRS. EDITORS:—If there is any thing this country should look upon with apprehension, it is the adoption of the monitor system by England or any other maritime rival. This subject is now being agitated in England by the most influential and scientific bodies. Already lectures of the most exhaustive character, accompanied by diagrams illustrative of our system, have been delivered before the Institution of Naval Architects and the Institution of Civil Engineers, before audiences composed of the highest dignitaries of the kingdom, attracted by the serious national importance of the subject.

Mr. John Bourne, the eminent English engineer, in a lecture before these scientific bodies, was so emphatic in his condemnation of the system adopted for their ironclad fleet as to cause great consternation among those who are responsible for it, while, on the other hand, so complete were his demonstrations of the correctness of the monitor system, that the supporters of the government plans were utterly discomfitted. Indeed, so prompt, decisive, and unanswerable were Mr. Bourne's replies to the interrogatories, which the members of these bodies are permitted to ask the lecturer, that even the Chief Constructor of the Navy, Mr. E. J. Reed, one of the most accomplished naval architects in Europe, was driven to the wall. Mr. Bourne concludes his demonstration with the following curt interrogatory, "Why then have we not got monitors? And what would our predicament be if such vessels were suddenly to confront us?"

Still further, we find that Mr. John Scott Russell, the builder of the *Great Eastern*, in his great work on naval architecture recently published in London, devotes much space to the discussion of the monitor system, and concludes with an endorsement fully as emphatic as Mr. Bourne's. Many others appear to have taken up and endorsed these views, for we find that for the last month, the columns of the London mechanical journals have been, to a great extent, occupied with correspondence backing up by even new arguments, the demonstrations of Messrs. Bourne and Russell.

To make a long story short, it may be briefly stated that opinion in England on this (to them vital) subject has reached such a pass that it seems only necessary for one of our monitors to anchor safely in the Mersey, to cause John Bull to commence at once a fleet of heavy monitors.

It seems that Mr. Assistant Secretary Fox, in the fullness of his wisdom has undertaken to complete this demonstration. If Mr. Fox can assign any reason, or even a pretext for not only sending a monitor to England but crossing in her himself, we should really

ike to hear it. We cannot afford to have a system, purely American, which has been proved through many a hard-fought battle, and in which consists our great naval strength, actually forced upon our great maritime rival, and that, too, simply because Mr. Fox has taken into his head that nothing short of a heavily-armed monitor will answer his purpose. If Mr. Fox really thinks it necessary for him to inspect the vents and breechings of foreign ordnance, and to place his fingers in the perforations in French and English ironclad targets, and that a national vessel should be detailed for this duty, we cordially approve of the plan; but, at the same time, we must be permitted to suggest that a "double rudder" would be the most appropriate vessel, both from their extraordinary speed and great maneuvering qualities. Either the *Winooski* or the *Eutaw*, if they can be spared from the dock trials and Potomac excursions, are well adapted for this duty.

PRO BONO PUBLICO.

Sawing Lumber.

MESSRS. EDITORS:—Having had much experience both in building and in running saw mills, having also acquired useful information upon this subject from others, I think I can justly claim to be "a practical sawyer," and I would like, for the benefit of those seeking information in relation to circular saw mills, to give some of my ideas, and in so doing take exceptions to some of those advanced by Mr. Churchill in your paper of May 12th.

We are beginning to think out here in "the virgin forests of the West," that we have better and more effective mills, and know better what is required in that line, than is known in the soft pineries, and second-growth timber lands of the Eastern States; at any rate, we know that the directions to give the saw one-half inch range toward the carriage in 20 feet, and to give the mandrel one-eighth inch end play, although possibly beneficial under a certain condition of the saw, or perhaps in sawing a certain kind of a log, are not at all to be relied upon under innumerable other circumstances; it is frequently as necessary to give the saw lead or "range" from the carriage as toward it; in fact it is very desirable to be able to vary and change the lead of the saw at pleasure. I like to have a mill constructed so that I can change and control the lead by varying the line or angle of the mandrel in relation to the carriage, so as to correct any tendency of the saw to vary from the true line either way. The provision made for this in the Martin & Ashcroft patent mills is the best and only convenient one I have seen as yet.

In using these mills I have many times in a day had occasion to make this variation, and have often done it while the saw was cutting in the log, and always with the most perfect success in correcting any difficulty in the lead of the saw (it is done by simply turning a nut upon a screw connected with the back box of the mandrel). I have also in the use of these mills found great advantage in keeping the points of the teeth in good order, and preventing the lumber from being scratched by the edge of the tooth, by using the arrangement for throwing the saw away from the log in running back; it saves the edge of the tooth next the log from being worn off unequally, and the face of the saw from being heated by the log rubbing against it.*

With regard to the one-eighth end play, it is an old idea, and is about run out, out here. If a saw commences to deviate from the true line it will be very apt to continue to do so, (this was learned long ago in using the handsaw). The effect of allowing this deviation is to saw irregularly, and often seriously injures the saw. The right way is to have your saw cut perfectly free and on a true line, and if it commences to vary, correct it at once; have the log held firmly against the head blocks so that it cannot spring, if it has any tendency to.†

The idea that the teeth of the circular saw should have the same form as the sash saw, is, I think, a great mistake, because it is desirable in all cutting instruments to have them as keen and sharp as they will stand in use without bending or breaking, and it is found that teeth of the circular saw will stand to be much more hooking and pointed than the sash saw.

I find that the best adjustment of the saw for general purposes (have it true, of course, both edgeways and sideways) is to hold it by means of the saw guide exactly at right angles with the line of the mandrel. I swedge back and spread out the points of the teeth of the common plate saw sufficiently to make a firm, cutting edge, and also to cut perfectly free and clear the face of the saw (I do not bend the teeth sideways at all but depend upon upsetting and spreading). I keep the tooth gummed out and filed under as hooking as it will stand; this depends upon the kind of timber to be sawed; the proper line for this will be one drawn from the point of the tooth to a circle from one-half to five-eighths the diameter of the saw. I have found the freest and best cutting saws (requiring the least power) to be those made with inserted teeth; the reason is obvious; the edge of a forged tooth can be drawn out much thinner and sharper and will stand a finer edge than the rolled-steel plate can be made to.* An objection to these saws is a danger that the teeth may get loose and fly out, yet a great many of this kind are in use with, perhaps, as few accidents as from the use of ordinary machinery. I hope the importance of the saw mill interests will excuse the length of this article, and hold myself ready to verify the correctness of it by practical tests if necessary.

WM. RICHIE.

Thorntown, Ind., 1866.

*The use of Martin's & Ashcroft's patent is owned by Messrs. Owens, Lane, Dyer & Co., of Hamilton, Ohio, who are extensively engaged in manufacturing them.

†A good device for this in many cases is an improved saw mill dog, patented by A. S. Pettigrew, August 2, 1864.

*Saws of this kind are manufactured by Messrs. Spalding & Brothers of Chicago, by the American Saw Company of New York, by Woodrough, McFarlin & Co., Cincinnati, Ohio, and probably by other saw manufacturers.

NEW PUBLICATIONS.

A MANUAL OF BLOW-PIPE ANALYSIS AND DETERMINATIVE MINERALOGY, FIFTH EDITION. Wm. Elderherst, T. Ellwood Zell, Philadelphia, 1866.

This book is used as a text book in several of the colleges, and is the best book on the subject extant, at least in the English language. It will prove of great utility to chemists, miners, and mineralogists.

The blow pipe is an instrument easy to use for ordinary purposes and enables one to determine in the readiest manner the character of minerals. The highest skill in its use, however, requires great study and labor, and perhaps genius. Platner, who might be named the Paganini among blow pipers, could do about as much with a shilling blow-pipe as ordinary chemists with all their costly apparatus and chemicals.

The price of this book is $2,50 and in this city may be obtained of D. Van Nostrand, 192 Broadway.

DIFFERENTIAL CALCULUS.—With Unusual and Particular Analyses of its Elementary Principles, and Copious Illustration of its Practical Application. By D. John Spare.

We have received the above work from Messrs. Bradley, Dayton & Co., Boston. We do not doubt that it is a valuable mathematical work, but we would thank the publishers who send us books to be noticed, to forward them at their own expense, and not charge us for the privilege of noticing them.

THE IRON MANUFACTURER'S GUIDE.—This is the title of a volume of over 800 pages, royal octavo, compiled by J. P. Lesley, Secretary of the American Iron Association, under whose authority the work is issued. Two hundred and sixty-two pages are devoted to a full history of all the anthracite and charcoal furnaces, bloomeries, forges, and rolling mills in the United States, making it highly valuable as a book of reference to the manufacturer, dealer, and capitalist. The remainder of the volume treats of iron as a chemical element, an ore, and a manufactured article. It will be seen that the geologist, the mineralogist, the miner, and the manufacturer, have each somewhat of interest in the work. It is evidently a book of practical utility as well as of theoretical interest. Published by John Wiley, New York.

COAL, IRON, AND OIL.—This is the unpretending title of a work just published by Benjamin Bannan, editor and proprietor of the *Miner's Journal*, Pottsville, Pa. The book is compiled and edited by himself and S. H. Daddow, mining engineer, and is the most practical and exhaustive treatise on the subject that has come under our observation. The theories explaining the formation of coal and the generation of petroleum are somewhat novel, but appear to be based upon careful observation and analogy. We cannot but agree with the evident belief of the authors of this treatise, that the formation of petroleum, if not of coal, is not altogether and wholly an event of the past, but that the process is still going on, although perhaps not so rapidly as formerly.

The description of the great coal and oil basins of this country will be found valuable and interesting to the business man and general reader, while the statistics and information relative to these two great natural products, will arrest the attention of the practical man and the scholar. The manufacture of iron from the ore is treated in an eminently practical manner, making the work one of great value to mechanics and manufacturers. We shall take occasion to refer again to this treatise when time and space permit.

The volume is one of eight hundred pages and contains over two hundred engravings with numerous tables. It is a most valuable work, and one that deserves to be read by all intelligent men.

Report on the Cattle Plague.

The possible introduction of this dreadful scourge into our country cannot be contemplated without causing much uneasiness, when the fact is borne in mind that in England the plague has swept off sixty-five thousand cattle, valued at $4,500,000. A commission was appointed by the British Government to consider this subject, and the result has been any thing but conclusive. There has been a great deal of confusion about remedies, and medical treatment has been of no avail. It is, however, made clear by evidence that the proportion of recoveries is very largely increased "by judicious feeding with soft mashes of digestible food." Under this treatment, out of 503 cases, 191, or nearly 38 per cent, recovered. It is remarkable, moreover, that dividing these beasts into two groups, according as they belonged to large or small stocks, in the former 22 per cent, while in the latter 62 per cent, recovered. The explanation offered is that in smaller stocks fewer beasts are ill at once, there is less concentration of the poison, less crowding, and, not least, better nursing. An analysis of another group of 813 cases indicates still more conclusively the influence of feeding. Among cottagers' cattle, generally fed on mashed food, the recoveries were 73 per cent; in large stocks, where dry food was often given during convalesence, the recoveries were 57 per cent; with mixed food of mashes and hay they were 22 per cent; while among cattle fed entirely with dry food, and treated medically with drugs, the recoveries were but 13 per cent. The number of cases is too small for us to depend on these averages; but they are sufficient to establish the general fact. We may take it as ascertained that "powerful drugs of all kinds greatly highten the mortality of the Cattle Plague. . . . Perfect cleanliness, ample ventilation, constant disinfection of the air and discharges by tar acids, and the most careful feeding with soft mashes of the most digestible food—such, and such only, are the measures which our present experience sanctions for the treatment of the disease." Such a conclusion is quite in accordance with the congested state of the stomach which has been observed after death, and the commissioners believe that a similar restriction as to diet formed the most important part of the cure.

Storage of Gun-cotton.

Gun-cotton is now made into ropes for storage, and kept under water. When an order is received at the manufactory, a few hours suffice to send the cotton on its way. It has been found that by making the ropes with many air channels through the mass, the cotton explodes almost instantaneously, and is as violent in action as the strongest fulminates. Charges for guns are now made into two parts; an exterior composed of cotton of loose texture, the ignition of which starts the ball), and an interior of denser material, which supplies the gas necessary to keep up the constantly accelerating speed of the ball. The result is great gain in initial velocity. Compared with powder in an Enfield rifle the cotton gave a trajectory having an incurvation of $3\frac{1}{2}$ inches, the powder $3\frac{3}{4}$ inches in the first 100 yards.

SLATES.—The test of a superior slate is its ability to remain unbroken, after being made red hot in a furnace, and suddenly immersed in cold water, while at that heat.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued on the 29th inst., with the names of the patentees :—

FORCE PUMP.—J. H. A. GERICKE, New Orleans La.—This is a force pump operating on the principle of a turbine wheel, designed for raising great bodies of water in short periods of time, as when draining low lands, pumping water out of ships, mines, and other low places.

STEAM BOILER.—A. J. SMITH, Greenville, Ohio.—This is a boiler in which the steam is formed in small quantities as required. It consists in combining a perforated interior boiler and induction water pipes with each other and with the outer boiler.

SWIVEL SHACKLE.—T. B. ROCHE, Folsom, Cal.—This shackle possesses many advantages over the ordinary swivel blocks—being much cheaper, works better, and the rope cannot possibly be twisted.

SELF-SEALING FRUIT CAN.—J. R. and N. E. LUPTON, Stafford, O.—By means of this invention fruit can be sealed air-tight by an improved stopper, so that the fruit can be kept sound and sweet for any length of time, and the stopper can be removed without injuring it.

LAMP-LIGHTER'S TORCH.—C. D. WALTERS and JOHN WILSON, Harrisburgh, Pa.—This is a convenient apparatus for lamp-lighters' use; and consists of a torch formed by combining a lamp, a system of wrenches, and a match box with each other and with a handle.

ROLLS FOR WASHING AND WRINGING MACHINES.—S. F EMERSON, Seville, Ohio.—This invention consists of a hollow slotted cylinder of wood, on which the roller is made, the rubber being secured to the cylinder by wedges, bands, and ferrules, so that the rolls may be removed from, and attached to, the shaft of the machine when required.

LOWERING SHIPS' BOATS.—SAMUEL BROWN and LEON LEVEL, San Francisco, Cal.—This invention is to provide a means whereby both the hauling parts of the tackles may be under the control of one person instead of two, as heretofore, and in such a manner that a friction brake may be employed to lower the boat fast or slow.

STEAM TRAP.—WM. FUZZARD, Chelsea, Mass.—This device consists in the arrangement of a buoyant stopper made of cork and placed in the exhaust chamber, which is provided with a suitable seat at its bottom, so that when steam passes into the exhaust chamber the buoyant stopper is depressed on its seat by its own gravity assisted by the pressure of the steam, but if water accumulates in the exhaust chamber, the buoyant stopper begins to float, and the water has a chance to escape.

SEWING MACHINE.—ALBIN WARTH, Stapleton, N. Y.—This sewing machine, by a single change in the mechanism, can be adapted so as to produce the loop or the chain stitch.

CUT-OFF FOR RAIN-WATER PIPES.—L. W. DOTY, Aurora, Ill.—This invention consists in the construction of a box of metal or other suitable material, with a partition extending up for a certain distance from the base, at the top of which there is pivoted or hinged a swinging gate, so arranged in regard to an induction pipe opening into the top of the box that the water entering the box may be thrown into either of two eduction pipes emanating from the bottom of the said box, and thus the water may be directed into different receptacles.

TURNING BOILER FLANGES.—EDWARD PAYE, New York City.—This invention consists in the use of a series of hammers in combination with cams or other suitable mechanism by which a reciprocating motion can be imparted to them, and with a suitable device for supporting the flue sheet in the required position so that by a succession of blows of the hammer the flange of the flue sheet is turned with little trouble and in a comparatively short time.

ATMOSPHERIC GOVERNOR.—BENJAMIN MACKERLEY, Paint, Ohio.—This governor by the compression of the atmospheric air in a cylinder or suitable receiver, a brake is applied, and by these means the speed of a motor of any desired description, but particularly such driven by animal power, can be regulated with the greatest care and accuracy.

COMBINED SCREW WRENCH AND HAMMER.—L. S. and E. G. HOYT, Croton Falls, N. Y.—This is an arrangement of a stationary and a hinged adjustable spring jaw on one end of a handle, to the other end of which a hammer is rigidly attached, so that a tool is obtained which serves the double purpose of a hammer and a screw wrench, and is cheap and very convenient.

CYLINDER BRUSH.—SILAS STUART, Sterling, Mass.—This brush relates to that class used in lathes for polishing metals; it consists in forming the holder for the bristles in sections but so that when joined together the bristles will present an unbroken periphery, while a brush of any desired length may be formed by simply using more or less of the said holder sections.

WATER INDICATOR.—GEORGE LUTZ, of Lancaster, Ohio.—This invention is to simplify the construction and arrangement of the parts of a water indicator for steam boilers, to render it more effective in operation.

SKIRT SUPPORTER.—WILLIAM BACHELLER, West Newbury, Mass.—This skirt supporter is worn around the waist just above the hips over which the skirts are placed and so supported as to be free from the hips, and so as to accommodate itself to their movement when the person wearing it is walking.

STRETCHING AND TACKING CARPETS.—F. M. OSBORN, Dover Plains, N. Y.—This is a novel combination of a carpet stretcher and a hammer for driving the tacks; they are so arranged with regard to each other and operated by a common lever handle, that when the carpet has been stretched the hammer will be brought down with sufficient force to drive the tack through the carpet into the floor.

SCREW-CUTTING MACHINE.—A. B. SIMONDS, Youngstown, Ohio.—By the combination and arrangement of the different parts of this machine, screws may be cut accurately and of any required length without changing gages or stopping it.

LEATHER-DRESSING MACHINE.—TYLER C. LORD, Portland, Oregon.—This invention relates principally to an adjustable table for scouring, finishing, and doing general table-work in dressing leather, together with other machinery, to be used for similar purposes, in connection with such table.

FRUIT GATHERER.—ELIZA H. NEWCOMB, New York City.—By the construction and arrangement of the several parts of this gatherer the operator is enabled to produce a shear cut by the resistance only of the stem of the fruit upon withdrawing the gatherer, thereby avoiding the necessity of great exertion on the part of the operator.

BEER PITCHER.—W. P. AYRES, Nashua, N.H.—This invention consists in constructing a pitcher, or other vessel into which brewed liquors are drawn from the cask, with a partition plate dividing off a chamber in front of the spout, and in placing transversely across this chamber as well as across the main portion of the pitcher, perforated plates which serve as strainers or condensers, whereby the liquid may be poured out clear of foam; the pitcher is also provided with a tunnel-like mouth for the better guidance of the liquor into the pitcher.

CHURN POWER.—DAVID J. KNAPP, Fallsburgh, N. Y.—This is a means for operating churns with rising and falling dashers; it consists of a train of wheels having a spring for a motor, driving a pitman passing through a guide and connected with the dasher rods.

SHAFT COUPLING.—GEORGE L. BARRON, Bethlehem, Pa.—This is a shaft coupling, simple and easy of adjustment, which will hold the shaft securely coupled, It combines a shell, key, and set screws with the ends of the shaft to be coupled.

WEIGHING SCALES.—JACOB KING, Fort Wayne, Ind.—This invention consists in pivoting the scale pan to the short arm of a curved lever, the long arm of which is weighted. The lever is pivoted to the scale frame by a knife-edged pivoting pin, the latter also operates the index finger.

WATER COOLER.—J. M. BAIRD, Wheeling, West Va.—This invention consists of a tank with a cone-shaped bottom, set vertically in the ground a few feet below the surface. Its top is connected with a water pipe, and the apex of the cone-shaped bottom with the discharge pipe of the hydrant.

HORSE HAY FORK.—T. H. ARNOLD, Troy, Pa.—This invention consists of bars, levers, and hooks or prongs, so arranged as to take nearly a vertical position when thrust into the hay, which may then be opened into the form of a harpoon to lift the hay, and which may be again closed to drop the hay where required.

TRACE BUCKLE.—ADAM HAGNY, Keokuk, Iowa.—This is a double-tongued trace buckle, so constructed that the trace itself may keep both tongues closed, and the two tongues may divide the draft strain of the race.

GRAIN CLEANER.—JOHN STEVENSON, Lionville, Ind., and JOHN J. CRIDER, Greenfield, Ind.—This invention consists in so constructing the screen that by its revolution the grain can be thoroughly cleaned from cockle, cheat grass, etc., which seed find their way through the meshes of the screen.

HAY LOADER.—CHAS. GIBBS, Pittsfield, Vt.—This invention consists of a hay loader or fork pivoted to the side of the wagon frame, and so arranged with ropes, pulleys, levers, ratchet wheel and pawl that, by the advance of the wagon the hay will be raised from the ground and deposited on the wagon.

REAPER.—SEWELL GILLAM, New York City.—This improvement consists in dividing an ordinary sickle or cutter into the two sections, one working outside of the other, and each having a cutting front distinct and separate from the other, so that the weight of the sickle is divided, and then driving the different cutters or sections by different cranks placed at right angles to each other, so that the cutting labor is also divided—one crank being at its dead point when the other is at the center of its stroke.

STEAM BATHING APPARATUS.—J. YOUNG, M. D., Williamsburgh, N.Y.—This invention relates to an apparatus which enables persons to take a steam bath in their room without requiring a cumbersome mechanism, steam being generated in an ordinary tea kettle or any other suitable vessel, and injected into an annular chamber, which is placed under the chair occupied by the patient, said chair being situated within a light frame of wire or other suitable material, on which a sheet is hung so as to concentrate the steam escaping from the annular chamber on the body of the patient.

Notes and Queries

W. G., of Pa.—We thank you for your suggestion in regard to the proposed bill for taxing inventors. Remonstrances signed by inventors will do good—but inasmuch as they are much scattered as to locality it will not be easy to procure their signatures. We advise them to write letters of remonstrance to their U. S. Senators.

S. P. C., of N. Y.—Salt, heated with coal in a gas retort to a dull-red heat for five or six hours, is volatilized to the extent of about 60 per cent.

A. R. C., of S. C.—We are not acquainted with any machine for pressing Sea Island cotton in round bales, though we do not doubt that cotton presses can be modified to meet your wishes.

H. H., of Ohio.—You did not sign your name to your letter, therefore, we are unable to address you by mail. We prefer to give opinions respecting the novelty of inventions by mail, as such questions are not usually of general interest.

W. H., of Ill.—Your communication in regard to perpetual motion is received, but inasmuch as it does not contain any thing useful we decline to publish it. We say to you candidly that you are hunting a needle in the hay mow, and all your time and money will be wasted, and you will be a disappointed adventurer. We have said the same thing before hundreds of times.

E. T., of Ohio.—We are not aware that any reward is offered for the discovery of the principle of the Giffard's Injector.

T. C. K., of Pa.—The boiler you describe, if properly set and having a good draft, ought to be sufficient to drive your engine. Much depends, however, on the construction of the boiler as to fire surface.

W. H. S., of N. J.—Many persons who are ignorant of the practical working of patented inventions, will insist that not one in a hundred is worth a farthing. There are thousands of inventors who are successfully engaged in the manufacture of their improvements, and the records of the Patent Office show that the sale and assignment of patents are very numerous.

H. H., of La.—Otis Tufts, of Boston, has secured patents for vertical railways or elevators for hotels. They are used in some of our largest hotels.

H. G. B., of N. Y.—We know of no better way to start rusty nuts than to put a few drops of kerosene in the end of the bolts, so that it will penetrate the threads, and the screw will immediately loosen.

J. H. P., of Ill.—The question you ask involves a complicated mathematical problem, and would require a good deal of time to prepare it.

T. P., Jr., of Me.—Byrnes's statement is as nearly correct as can be. Our correspondent must recollect that if the facts do not square with his theory, it is not seldom that a wide difference is detected between theory and practice. For all practical purposes the indicator card will exhibit the amount of friction in the steam engine.

A. G. C., of Ill.—The present issue of our paper contains a communication on filing saws, which, we think, has some good points. We have heretofore published considerable on this subject and can do no more than to refer our correspondent to our columns. We know of no better manual on the subject, than the one referred to by you. Your ideas on manuals for mechanics are sound and sensible. Next to personal instruction and practice, a plainly written manual by a practical man, is the best means of correcting false notions and reforming bad habits. These books cannot be too plainly written. Scientific verbiage, for the use of mechanics generally, necessitates a glossary.

Sub. of Pa.—Crude petroleum is utterly unfit for an unguent, and no preparation from it has yet been made that did not contain substances and elements very injurious to the hair.

A. B., of Md.—Queen Anne's "pocket-piece" is about twenty-five feet long and carries a ball (spherical,) of only eighteen pounds. We do not know the diameter at the breech, but from the style of guns made when this was cast, and the weight of the ball, it cannot be three feet. We have many guns much larger every way except in length. This nation has the largest guns in use in the world. There can be no question on this point.

F. B., of Pa.—Undoubtedly sufficient light for reading or observing objects could be concentrated from phosphoric vegetation, insects, etc., but *cui bono?* The cost of apparatus would be more than the benefit gained. The gigantic glow worm of the torrid zone is sometimes inclosed in a glass bottle and made to do duty as a lantern, and the sugar bugs, it is said, will light up a cane field at night so that a person can read.

A most extraordinary occurrence took place along the line of the Nashville and Decatur Railroad, between Columbia and Pulaski, lately, during a thunder storm. A full mile of the telegraph wires were melted, and divided over that whole distance into small fragments, irregular in shape, and many of them no longer than a buck shot or a small rifle ball. The fragments found along the whole distance, would not, if put together consecutively, make more than thirty feet in length. The glass insulators were bursted, and the poles shivered into fragments.

The most curious work at present going forward in Paris is the leveling the hill of the Trocadero, on the right bank of the Seine, opposite the bridge of Jena. One-fourth of the work is already completed. The ground is mined, and four mines are fired simultaneously by means of an electric battery. A surface of more than two acres is raised by each explosion, and wagons are ready on a temporary railway to carry away the earth thus loosened.

The Lansingburg (N. Y.) Gas Works has recently made some interesting experiments in the manufacture of gas from peat taken from a bed in this State. The peat used was air-dried without pressing, and then thrown into the retort. The gas was pronounced to be in every way equal to that made from the best coal. It gave a clear, white, and strong light, and stood the chemical tests well.

Nearly twenty-five hundred pounds of wax are now required yearly in sealing patents for inventions in Great Britain. This relic of barbarism is about the size of a large Dutch turnip and, is suspended to the parchment by a stout silk cord, and boxed in a tin case.

The Richmond *Republic* urges, as a practical measure of reconstruction, that the people of the South bend their energies to restore the waste places of the land, to build up agriculture, manufactures and commerce, and to unite themselves by railroads with all parts of the country.

Professor Agassiz, in a recent letter, reports the discovery of 1,400 new species of fish and animals, a number far greater than he had any reason to expect.

Portable Boring Machine.

It is not many years since it was the custom, in nearly all the machine shops in the country, to put on their large wheels, pulleys, etc., with four, six, eight, and sometimes twelve keys; and it is no small job—as the writer knows from actual experience—to cut the key seats in a cog wheel eight or ten feet in diameter, stake it on the shaft true, and fit the keys. And this mode of doing work prevails to a great extent at the present time, not because this is considered the proper way to do work, but because proprietors of small shops cannot afford to put up a lathe of sufficient capacity to do this kind of work, as it would involve an outlay of from three to six thousand dollars, and then perhaps they would not have work enough to keep it going one-fourth of the time.

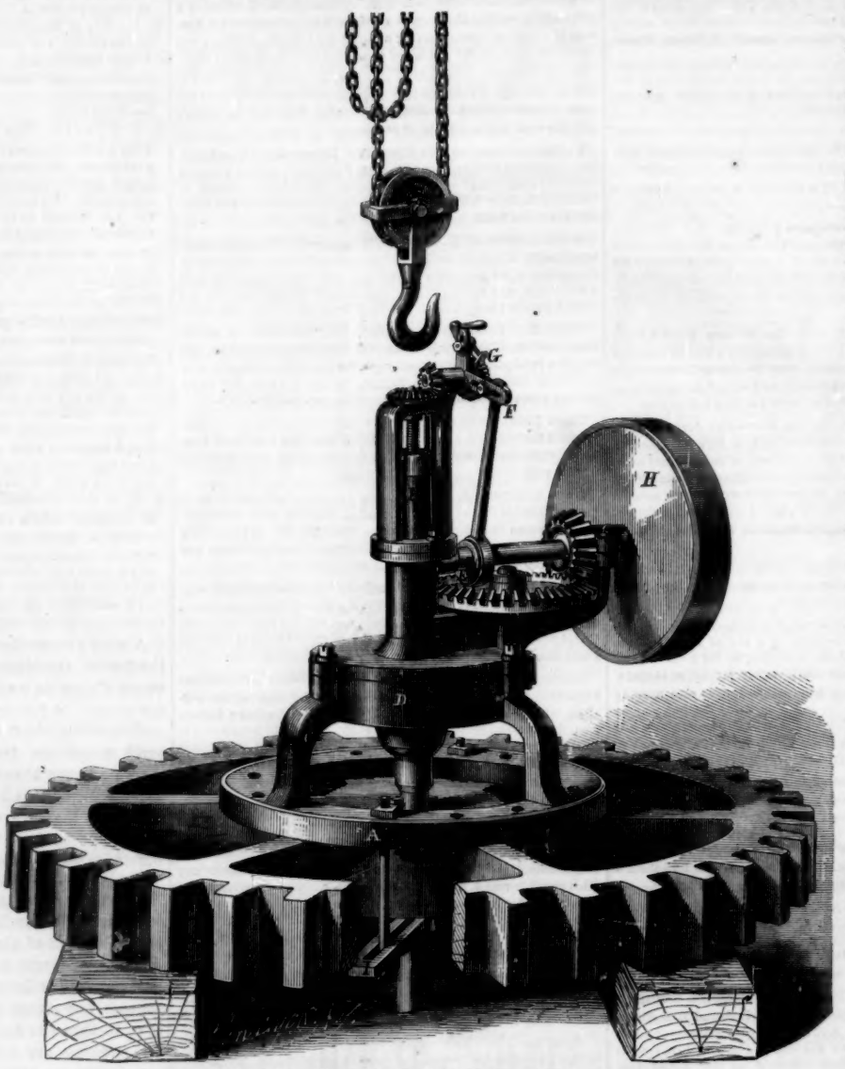
The machine here illustrated is designed to meet the wants of all, as it can be used with advantage and profit in both large and small establishments; it frequently happens, in large shops, that they make large fly wheels, spiders for cog wheels, or propellers, that would require a great deal of time and labor to move them into the machine shop and set them on a boring mill. In cases of this kind this machine can be taken to the work; and, if not convenient to power, can be run with small portable engine or man power.

One of these machines has been in use some time in a shop where they have a horizontal boring lathe, and it is used at all times in preference to the lathe, doing about double the work the lathe can do; the great advantage being in setting the machine ready for work, not requiring one-fourth the time that it takes to set the work on a horizontal lathe.

The engraving fully explains the construction and working of the machine. The base plate or ring, A, in Fig. 1, is turned—top, bottom, and edge—true with the spindle or boring bar, B B B, and has the legs, C, and box, D, cast on it to support the other parts of the machine. The feed is worked by the eccentric, E, and bell crank, F, having a slot so as to adjust the feed to the work; by throwing the small pawl, G, over, it will feed down or up. The pulley, H, is put on with set screw, so as to be changed for different size of hole. For boring deep holes the guide bar, I, is bolted on the under side of the wheel to be bored, so as to steady the bar. For boring large holes a cutter head is put on the spindle.

By using a differential pulley block to elevate the machine while changing the work, it makes a most simple, efficient, and neat arrangement for boring.

A patent is pending through the Scientific American Patent Agency. For further information or machines, address Allison & Bannan, Franklin Iron Works, Port Carbon, Pa.



ALLISON & BANNAN'S PORTABLE BORING MACHINE.

SPECIAL NOTICES.

Luther C. White, of Waterbury, Conn., has petitioned for the extension of a patent granted to him on the 7th day of Sept., 1852, for an improvement in the method of making lamp tops, rivets, etc. The petition will be heard on the 20th of August next.

Joseph Guild has made an application for the extension of his patent for an improvement in mortising machines, granted to him Nov. 30, 1852. The petition is to be heard on the 12th day of November next.

A Royal Locksmith.

A collector of artistic curiosities was recently exploring the store of a dealer in old iron, in the Rue de Meaux, at Petite Villette, France, when he remarked an elegant little lock, covered with rust, but bearing the inscription, *Lud. XVI. me fecit*, and which he purchased for three francs fifty centimes. He has since sold it for two thousand four hundred francs at a large curiosity shop in the Faubourg St. Germain, of which sum he immediately carried one thousand two hundred francs to the petty dealer in the Rue de Meaux.

Louis XVI. was, it is said, a very skillful amateur blacksmith. He was much ridiculed by the fashionable people of his time for soiling his hands with menial labor. But he did many things more foolish, and if he had attended more to his shop and his fellow craftsmen, the guillotine would not have been invented, and he would have been buried with his head still on his shoulders.

A Hint to Smokers.—M. Melsens, a French chemist, has found that tobaccoes from various countries contain nicotine in very different proportions. In tobacco from some parts of France there is 7·96 per cent of nicotine; while Havana tobacco contains only 2 per cent. He proposes to smokers a way of preserving them from the effects of the alkaloid, by putting into the tube of the pipe or cigar holder a little ball of cotton, impregnated with citric and tannic acids. As the smoke passes through the cotton, it will deposit the nicotine therein, in the shape of the tannate and citrate.

Bottled Caloric.

"Never despair," says Professor Jeannet, of Bordeaux; "your coal fields may fail, but acetate of soda will at any rate prevent your noble race from perishing during that gloomy British winter." This substance affords, in fact, says the Professor, a means of "storing up the solar heat." Its peculiarity is, that while it crystallizes when exposed, in solution, to a very slight degree of cold, it will cool without crystallizing if placed in a closed vessel. Cooling thus, it retains the greater part of the caloric which it had absorbed while being melted; and this caloric is given off the moment the bottle is uncorked or the jar uncovered. M. Jeannet has proved it. "One kilogramme of acetate, melted and then cooled down in a closed vessel to the freezing point of water, disengages, when crystallization is induced by uncorking, heat enough to melt 300 grammes of ice, or to raise 300 grammes of water from the freezing point to 79° centigr." Swift was not so very wild after all, then. Sunbeams from cucumbers would scarcely be stranger than solar heat from bottles duly placed "in a glass frame that the sun's rays may be concentrated upon them." Well may the *Union Medicale* call the path which M. Jeannet has struck out "a seemingly fantastic one." Still it clearly hopes for great results from the discovery, and seems to look forward to the time when there will be a brisk trade between England and the south of France in "bottled caloric," and when the Englishman, graduating his hospitality (as M. Kervigan tells us he does already in the matter of drinks) according to the quality of his guest, will, for an inferior, simply uncork a few bottles of the watery sunshine of his native island,—treat an equal to the strong but coarse caloric of Bengal—but if he has a lord at his table, will send down to his "heat cellar" for some of the "meilleur cru of the cote rotie"—warm but full of bouquet. *Nous verrons.* Any how, it is kind of M. Jeannet to try to console us under such a visitation as that which Mr. Jevons predicts, in the possible loss of our coal fields.—*Pall Mall Gazette.*

HUMORS OF BUSINESS.

Newspaper offices are frequently visited by very amusing letters, and though to many minds the details of our own office may appear as chiefly made up of dry facts and figures, we are, nevertheless, often relieved by the receipt of humorous correspondence. Thus, for example, we have now before us a letter from a patentee who wishes an illustration of his machine to appear in our columns. In a note to our artist he says very quaintly, "If you please, you may represent the driver with broad shoulders, bilious temperament, prominent Grecian nose, heavy moustache, short hair, full whiskers, trimmed short, broad brimmed hat turned up at the sides."

Another correspondent, with a view to secure special attention to a very modest request, with an air somewhat serio-comic, says of himself, "On week-days I am farmer, glazier, and homeopathic physician, and on Sunday I am a preacher of the blessed Gospel." A useful man, most certainly.

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COAL AND A SUBSTITUTE.

In our last issue we referred to the subject of the anticipated exhaustion of the coal beds of Great Britain as having engaged the attention of Parliament, through the agency of such eminently practical men as John Stuart Mill and Mr. Gladstone. That there is some reason for the anxiety manifested by these gentlemen, at least so far as coal is concerned, there can be no doubt, but we do not subscribe to the opinion that, with the last tun of coal, goes the welfare of the toiling millions of England. Coal, either bituminous or anthracite, is not a condensed form of carbon. It is bulky, and in combustion leaves a large residuum of no value at all as a fuel. Already, even in this country, where the supply is apparently inexhaustible, invention is busy to provide a substitute for coal, or rather to procure a better and less bulky article of fuel. Of course the growth of our forests cannot be depended upon, as wood is more valuable for other purposes, and its bulky nature, even if it could outlast a hundred generations, would prevent it from ever superseding the fossil fuel now so generally used.

But there is another substance more generally diffused in all countries than either wood or coal, and one which is being continually formed. This is peat, which in some respects has qualities as a fuel far in advance of coal. It is now being manufactured by disintegration and compression, and put in use for stationary and locomotive engines. For many years it has been used in its crude state for domestic purposes in this country, and in Ireland it is the common fuel. The "bogs of Ireland" are immense receptacles or reservoirs of this substance—the debris of dead vegetation—and in Wales and many portions of England it abounds. It is not less common in this country, and since coal has ruled so high, attention has been turned to this substance, so plentiful and so easily obtained. It is said to give, weight for weight, a much greater heat than coal, and for foundery and smelting purposes, is superior, as being entirely free from sulphur.

The bogs, or meadows containing peat, are in many localities continually encroaching upon the firmer land. The movement of the immense masses of decayed vegetation in morasses between hills or on the slopes of mountain ranges, is analagous to that of the glacier—imperceptible but sure and certain. There are cases in England, in Scotland, and even in this country, where the bogs have pushed their boundaries, year by year, until large tracts of valuable farm lands have been overwhelmed and ruined. Here, then, are inexhaustible mines equal to those of coal, and having the advantage of being on the surface and easily wrought.

But the experiments in working petroleum as a fuel have not yet proved failures. There is but little doubt but this substance will be made to occupy an important position in the economy of domestic and manufacturing enterprise, so soon as its production in quantity sufficient will reduce its cost to a figure which will authorize its employment as a fuel.

Common pitch, from which the spirit of turpentine is distilled, has been tried in a pulverized state by a Russian naturalist, and is now being tested by the Russian Admiralty as a fuel for generating steam in the boilers of steam frigates. The result thus far, has been, report says, eminently satisfactory.

A French chemist claims to have realized the fable of bottling up sunlight by means of acetate of soda. He claims that by evaporation, after being confined, this substance will give out a strong heat. If he is successful our English friends of this generation may be able to carry in their pockets portable stoves for warming the outer man as many now carry stomach warmers.

Seriously, however, we cannot suppose that a diminution of the fuel now used can occur to such an extent as to threaten the prosperity of a great manufacturing nation without bringing with it a discovery which shall at least make good the loss.

BREECH-LOADING RIFLES FOR SPORTSMEN.

By reference to our Washington correspondence, it will be seen that at least one man is ready to bet that, with his breech-loading rifle, he can surpass in accuracy any muzzle-loader that can be produced—proving pretty conclusively that in the one thing needful—accuracy—breech-loading rifles have at last reached a point of excellence equal to that of muzzle-loaders. As they are greatly superior to muzzle-loading guns in convenience, ease, and rapidity of loading, and as they obviate the necessity of carrying into the woods a variety of apparatus—ramrod, powder horn, charger, percussion caps, and in the case of false-muzzle guns, mallet and driver—they will now, no doubt, be generally adopted for sporting purposes.

A very general defect in breech-loading rifles, made up to the present time, has been a want of sufficient weight in the barrel. For army purposes it is manifestly extremely desirable to have the arms of infantry soldiers made just as light as possible, the man being required to carry on foot a load of other things; but for any considerable range this lightness can be obtained only at the expense of accuracy. There is no use in offering to sportsmen a gun, however excellent in all other qualities, that is not absolutely perfect in accuracy. If there is anything which he regards with intolerable abhorrence it is a rifle that will not carry the bullet where it is pointed.

A very light rifle is peculiarly objectionable for those long ranges which are now in universal vogue. For these ranges it is necessary to have heavy elongated bullets and large charges of powder, producing a recoil which throws a light rifle out of position, and utterly destroys all accuracy of fire. The extent of the range is also diminished by lightness of the barrel. It was formerly supposed that one-half of the force of the charge was expended on the shot and the other half upon the gun, but Professor Treadwell has demonstrated that the portion of the force expended on each is in proportion to the distance which each is moved while the force is acting upon it—that is, during the passage of the shot along the barrel. This proposition was overlooked by a writer so well informed as Professor Silliman, and so recently as 1858. In his "First Principles of Philosophy," page 22, he says, "By the principle that action and reaction are equal (27), we know that when a musket is discharged the force of the explosion reacts upon the musket with the same intensity as it projects the ball. According to the principles of momentum, the weight of the gun, multiplied by the velocity of the recoil, must be equal to the weight of the ball, multiplied by the velocity of its projection, yet the recoil of the gun is received by the sportsman with perfect impunity, while the moving ball deals death or destruction to opposing objects."

Professor Treadwell's proposition results from the first principles of mechanics. Work is measured by the amount of the force and the distance through which it acts, regardless of time. It is somewhat surprising, therefore, that the proposition has been so generally overlooked.

The fatal want of accuracy, and the diminished range of very light guns, may be well worthy of consideration by our ordnance officers in determining the weight of our army rifles.

EDUCATING OTHER NATIONS.

Quite enough has been done, we think, in the improvement of other nations by our example alone, in originating, experimenting, and carrying to completion radical and valuable improvements in every department of mechanics, without carrying our schools to their doors and furnishing them with instructors gratuitously. Of course it cannot be expected that any national improvement, the operation of which must be open to the inspection of foreigners as well as our own people, can be kept a secret, but it is not necessary for the government to spend hundreds of thousands for the purpose of combating foreign prejudice and compelling a recognition of our superiority, when, if successful, the result will be merely to enable other nations to equal us, and thus relatively reduce our position.

The proposition of sending the *Miantonomoh* to Europe, in charge of Assistant Secretary Fox, ostensibly on a visit of ceremony to the Czar Alexander, but really to exhibit our progress in naval affairs to Europe, we do not really approve. It is unnecessary for us to go cruising about the world with a traveling show, in order to gain the respect of other nations. The game is not worth the powder. We know that we are the peer of any nation that boasts a navy, and if we desire to prove it we have only to refer to the achievements of our monitors during the past four years.

The resolutions of respect, sympathy, and congratulation, of which Mr. Fox will be the bearer, could as well be forwarded through our Minister at St. Petersburg, as sent in one of our largest monitors at an expense of at least one hundred thousand dollars.

Changes in Forms of Letters Patent.

We understand that Commissioner Theaker proposes some changes in the forms of patents issued to inventors. It is intended to reduce the size of the instrument from fifteen by twenty inches to ten by fifteen inches, thus rendering it of a more convenient size for mailing. The present large vignette of the Patent Office will be replaced by a much smaller view of the Patent Office, surrounded by small medallion engravings, representing the advancement made in machinery in the present century—all to be engraved in the highest style of the art, and printed on parchment paper. The seal of the Patent Office, instead of the words, "Seal of the Patent Office," will hereafter contain "United States Patent Office," and the sentence below it, "Countersigned and sealed with the seal of the Patent Office," will be omitted.

The specification for the patentee and the bound record in the Office will be printed instead of written as now. Another important improvement is in the manner of inserting the drawing, which is required to be ten by fifteen inches in dimensions. In the present form of patent the drawing cannot be newly inserted, but in the form proposed it can be adjusted with newness and precision. These changes can be made, the Commissioner thinks, without additional expense to the Government, and will render the patent a credit to the Office and to this Government, when sent abroad.

STEAM omnibuses are to be established in Paris to run from the Champ de Mars, the spot where the great exhibition is to be held, to the Place Bastile—making six halts. The distance is now traversed by horse omnibuses in one hour and twenty minutes. The steam company undertake to accomplish it in forty-five minutes including stoppages.

The Evening Post of the 25th ult., informs us that a Western gentleman has discovered the lost art of hardening copper. Will some one kindly inform us who lost it, how valuable it was, and if the finder got any reward?

ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING MAY 29, 1866.
Reported Officially for the Scientific American

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

55,034.—Self-fabricating Knitting Machine Burr.—Charles Allardice, Cohoes, N. Y. Antedated March 29, 1866:

I claim the shaft B, having its closed cup, b, in combination with the spindle, D, and its spiral grooves, a a, and the reservoir C, substantially as described, and for the purposes set forth in the above specification.

55,035.—Horse Hay Fork.—F. H. Arnold, Troy, Pa.:

A horse hay fork frame by combining the bars, A and C, the lever, D, and the prongs or hooks, E and F, the parts being constructed and arranged substantially as described, and for the purpose set forth.

55,036.—Machine for Cutting Cork.—Andrew J. Bailey, Charlestown, Mass.:

First, I claim the rotating knife, D, having its face in the form of an arc of a cylinder, and its edge parallel with its planes of rotation, when arranged in segments of a circle and operating in combination with the rotating mandrel, S, substantially as herein shown and described.

Second, The centering feeder constructed with elastic or self-adjusting grippers, for the reception of blanks of varying size, applied and operating in relation to the rotating mandles and opposite center, substantially as herein specified.

Third, The compound carriage, K M, having attached to it the mandrel which carries and produces the rotation of the cork in its rotation, and made adjustable relatively to the cutter wheel to vary the size and form of the cork, substantially as herein specified.

55,037.—Water Cooler and Purifier.—J. M. Baird, Wheeling, West Va.:

I claim a water cooler and purifier, formed by combining the tank, D, constructed and arranged as herein described, with the induction and discharging pipes, c and e, substantially as and for the purpose set forth.

55,038.—Method of Collecting and Separating Carbonic Acid from Mixtures of Gases.—James S. Baldwin, New York City:

I claim separating, purifying, and transferring carbonic acid gas from waste gases, by means of water, or its equivalent liquid, substantially in the manner, for the purpose herein set forth.

I also claim driving the pumps, or other machinery, by the waste gases evolved in this process, substantially as described.

55,039.—Method of Preserving and Storing Carbonic Acid Gas.—James S. Baldwin, New York City:

I claim the combination of vessel, A, with vessel, c, or the equivalent thereof, arranged and prepared substantially in the manner and for the purposes herein set forth.

55,040.—Method of Charging Water with Carbonic Acid.—James S. Baldwin, New York City:

I claim charging water, or other equivalent liquid, with carbonic acid, by inclosing said liquid with solid carbonic acid, in the same vessel, or series of vessels, substantially in the manner and for the purpose herein set forth.

55,041.—Shoe.—Achilles Ballard, Dublin, Ind.:

I claim a shoe, the vamp, A, and quarter, B, of which are shaped and united substantially as set forth.

55,042.—Machine for Bending Horse Shoes.—Hazen J. Batchelder, Boston, Mass.:

I claim the benders, *H H*, made and arranged in combination with the spring, *I*, in manner and so as to operate with the former, A, substantially as described.

I also claim the combination and arrangement of the jaws, l k, with the former, A, combined, and to operate with the spring bending levers, H H, substantially in manner as described.

I also claim the combination as well as arrangement of the dischargers, h h, with the former, A, and the bending levers, H H.

55,043.—Pruning Shears.—Adam Baumann, Philadelphia, Pa.:

I claim the rod, D, and its special spring, b, combined with and adapted to the hooked portion and knife of pruning shears, substantially as and for the purpose herein set forth.

55,044.—Stereoscope.—Alexander Beckers, New York City:

First, I claim a concave mirror or reflector, combined with the stereoscopic box and movable reflectors, b and c, substantially as and for the purposes set forth.

Second, I claim the sheet metal clasp, i, attached to the wire frame of the picture holder, as and for the purpose set forth.

55,045.—Horseshoe.—Jacob Behel and John M. Buell, Rockford, Ill.:

First, We claim the curved clamp, F F, in combination with a shoe having recesses, E, and openings, A, with projections, B, and the nut, y, for securing and tightening the shoe, the parts being constructed and arranged for use, substantially in the manner and for the purpose set forth.

55,046.—Means for Operating the Doffer Comb of Carding Engines.—Anthony A. Bennett, Newark, Conn.:

I claim the arrangement with the comb shaft, B, and its oscillating slotted arm, A, of the crank pulley, G, constructed as described, and its adjustable pin, D, in the manner and for the purpose set forth.

55,047.—Lock.—Wilson Bohannan, New York City:

First, I claim the arrangement of the catch or hook of the keeper, C, below the plate, a, and in rear of the base of the socket into which it enters in combination with the arrangement of the bolt, c, of the lock, substantially as and for the purpose described.

Second, The construction of the hooked keeper, C, with a beveled nose, in combination with the beveled nose of the self-locking bolt, c, substantially in the manner and for the purpose described.

55,048.—Lock.—Wilson Bohannan, New York City, and Frank G. Johnson, Brooklyn, N. Y.:

First, We claim inclosing the grooved tumblers, g g, together with their springs, h h, within cells which are formed in the movable case, C, constructed substantially as described.

Second, The construction of the called case, C, with a hooked bolt, c, a groove for receiving the guard plate, D, and a notch for receiving the nose of the hasp, B, substantially as described.

Third, The movable cap, "g", in combination with the nose, c, constructed for receiving the tumblers, g g, substantially as described.

Fourth, The combination of the guard plate, D, and movable tumbler case, C', all constructed and arranged substantially as described.

Fifth, The combination of the notched cylindric case, C', 2, with the hasp, B, 1, the said parts being constructed and operating substantially as described and for the purpose set forth.

Sixth, The means substantially as herein described and shown for throwing the hasp open when it is unlocked, in combination with the tumbler, case, C, constructed and arranged substantially as described.

Seventh, The combination of the friction spring, S, with the movable tumbler case, C, for preventing this case from moving too freely when the hasp is unlocked, substantially as described

Eighth, The construction of the tumblers with depressions in them for receiving and keeping in place, the springs, h h, substantially as described.

55,049.—Washing Machine.—J. E. Briggs, West Randolph, Vt.:

I claim the combination with the grooved board, B, of the perforated irregular pressing block, C, joint, G, and handle, D, when the parts are constructed and applied to a tub, A, in the manner and for the purpose specified.

55,050.—Snap Hook.—Charles B. Bristol, New Haven, Conn.:

I claim as a new article of manufacture, the hook and loop part, A and B, cast on a plane in combination with the tongue, c, and spring, g, when the parts are constructed, attached, and fitted for use, substantially as herein described.

55,051.—Portable Fence.—Albert Brooker, Atlissa, Iowa:

I claim a fence having posts, A B and D, with brace, C, and cross slats and rails as represented, all constructed combined and arranged substantially as herein specified.

55,052.—Reversible Lock or Latch.—Asa T. Brooks, New Britain, Conn.:

First, I claim a latch hub made in two or more parts, acting conjointly with each other, substantially as and for the purpose described.

Second, I claim the arrangement of the several parts in the manner substantially as described, by virtue of which the spring is made to act in the double capacity of actuating and holding the latch and slide respectively in place.

Third, I claim the combination of the latch bolts, b, spring, e, with or without the plate, d, slide, i, and two or more part hubs, substantially as and for the purpose described.

55,053.—Apparatus for Lowering Ships' Boat.—Samuel Brown and Leon Level, San Francisco, Cal.:

We claim a breaking block for running out even lengths of two or more ropes having an extra set of sheaves, c, which are capable of being moved to and from the real sheaves, a, by a breaking lever, F, the different sets, a c, of sheaves being secured rigidly to their pins, b d, substantially in the manner and for the purpose set forth.

55,054.—Lamp Chimney.—V. W. Brown, Camden, N. J., and D. Frankish, Philadelphia, Pa.:

We claim the chimney, A, having a portion at X, flattened or depressed, as and for the purpose described.

55,055.—Method of Blasting.—Nirum Cadwallader Birchville, Cal.:

I claim the use of compressed air in combination with all explosive substances, for the purpose of increasing the explosive force of said substances by the aid of a greater amount of oxygen, and assisting by the force of pressure, as well as by the expansion of the air from the heat generated by the explosion, said compressed air to be confined in a chamber with the explosive material, or when in a chamber or recess contiguous to it, to be let free at the time the explosion takes place, substantially as described and for the purpose set forth.

55,056.—Machine for Punching Paper for Telegraphs.—Edward A. Calahan, Brooklyn, N. Y.:

I claim a type wheel revolved by friction in combination with revolving stops and keys, and an apparatus, substantially as specified, for punching fillets of paper for composing telegraphic messages, as set forth.

Second, I claim the stoppage bar, 39, escapement, 33, and ratchet wheel, in combination with the shafts, B' and g''', as and for the purposes specified,

55,057.—Sash Supporter.—E. A. Campbell, William's Bridge, N. Y.:

I claim the lever sash supporters, f and i, formed with their ends wide in the manner shown, so as to be fitted upon fulcrum screws in recesses in the casing beneath the molding, as and for the purposes set forth.

55,058.—Farm Gate.—Jarvis Case, Springfield, Ohio:

First, I claim so constructing and arranging the rests or supports, r r, with shoulders, c c, in combination with the notches, n n, and post, A, that the gate may be readily placed on said rests or supports in its proper position in relation to the post, and moved forward to close the gate or swung round to fully open it, or if so desired, may be taken off the rests or supports and removed from the posts, substantially as described.

Second, I claim so constructing and arranging the rests or supports, r r, and adjustable piece, D, with the gate and posts, that when closed the gate is firmly held in place, or may be partially opened and still retained in its proper position, resting a portion of its weight on each post, substantially as set forth.

55,059.—Harvester Rake.—William J. and Rhutson Case, Pittstown, N. J.:

First, I claim the combination of a vibrating sweep rake, with a crane post rigidly secured to and turning upon the main frame by means of a system of levers forming a parallel rule joint, substantially in the manner described, for the purpose of enabling the rake to conform to the undulations of a hinged platform without the use of a connection between the rake and platform, as set forth.

Second, The combination with the rake, of the bevel gear, F, cam, f, tappet, o, rock shaft, G, and arm, F, as described, for the purpose of raising and lowering the rake.

Third, The combination of the rake and crane post by means of inclined arms, arrangeo and operating substantially as described, to enable the rake to strike close to the finger beam.

Fourth, The combination of the clutch lever, e, with the locking arm, e', when arranged and operating as described, for the purpose of simultaneously uncoupling the rake and locking its driving wheel.

Fifth, The guide, B, to support the rake after discharging the gavel.

Sixth, The arrangement between the cranks, g i, of the adjustable pitman, H, as described, for the purpose of varying the stroke of the rake, as set forth.

Seventh, The combination of the levers, K M, with the rake arms by the socket joints, P, as set forth.

Eighth, The combination of the rake head with a system of levers, substantially as described, for the purpose of locking the rake in a vertical position over the frame for transportation, as set forth.

Ninth, The combination, substantially in the manner described, of the hinged platform with the self-locking automatic rake so located upon the main frame as to enable the finger beam to be folded up for transportation.

55,060.—Harvester Rake.—P. Charles Chipron, Highland, Ill.:

I claim the combination of the teeth, e, curved wire teeth, f, and the rake head, E, arranged and operating in the manner and for the purpose herein specified.

55,061.—Fruit Basket.—W. Clement, Charleston, Ill.:

I claim a fruit box, constructed substantially as herein described

55,062.—Self-tilting Bucket for Wells.—Aaron J. Cook, North Branford, Conn.:

I claim the combination and arrangement of the shaft, C, drums, D and E, and the bucket, G, suspended on cords or chains of an equal length, the whole being constructed and arranged, substantially as herein described and set forth.

55,063.—Flour Packer.—Isaac Cook, St. Louis, Mo.:

I claim the use and combination of the packing tube, C, the connecting tunnel, B, and the feed spout, A, with such flour packers as use a packing device which in packing rises out of the tube, C, and when otherwise arranged as set forth.

55,064.—Fastening for Garments.—William P. Cook, New York City:

I claim a fastening for garments and other articles, constructed and operating substantially as herein described.

55,065.—Open Coal Grate.—Clay Crawford, East Cleveland, Ohio:

First, I claim the magazine, B, in combination with an ordinary open fire place, substantially as and for the purpose set forth.

Second, In combination with the magazine, arranged in the open fire place as described, I claim the grate, D, having the bars inclined to throw the coal to the front, as shown and described.

Third, The air chamber, H, or its equivalent, arranged to operate in combination with the magazine, B, as set forth.

Fourth, The tube, E, arranged to operate in connection with the magazine, B, substantially as set forth.

55,066.—Screw Wrench.—John L. Christ, Harrisburg, Pa.:

First I claim the combination of A A', and B B', operating substantially in the manner described.

Second, The slotted rotating ferrule, D, serving also as a lock for the sliding jaw, A, and operating in the manner shown and described.

55,067.—Car Brake.—John Davis, Alleghany City, Pa.:

First, I claim applying brakes to wheels of railroad cars, so that said brakes become operative by the action and inaction of the locomotive and cars always operating with relation to the wheels, so that they will adjust themselves, and bring the proper force to bear on the wheels, when the locomotive becomes inoperative from any cause, or when any undue or improper action is imparted to the cars, said brakes being constructed and arranged substantially as herein described and set forth.

Second, So arranging the cranks, O and O', on the spring shaft, L, that it will require less power to hold the brakes off the wheels, than is required to draw them off, as herein described and set forth.

Third, The combination of the pawl, m, and ratchet wheel, n, with the shaft, I I', cranks O and O', and coil spring combined, arranged and operating substantially as herein described and for the purpose set forth.

Fourth, The combination and arrangement of the coil spring, I I, cranks, O O', rods, j k j' k' levers 18 and 16, and shaft, x, with the rods, I I', and h h' brake bars, e, and brake, d, the whole being constructed, combined, arranged and operating, substantially as herein described and for the purpose set forth.

55,068.—Washing Machine.—George M. Denison, New London, Conn.:

I claim the elastic knobs, F, in combination with elastic ribs, G, on the surfaces of the rubber and bed, respectively, of a washing machine, substantially as herein set forth and for the purpose specified.

55,069.—Plow.—Liberty B. Dennett, Portland, Me.:

I claim the standard, C, supported by the wing or brace, F, extending from the standards to the rear of the mold board, the standard, C, being so placed as to offer no resistance to the stubble or grass as it falls over the mold board into the central cavity of the plow.

55,070.—Rock Drill.—Julius C. Dickey, New York City:

I claim the combination of the drill bits, A B and C, substantially as set forth.

55,071.—Apparatus for Distilling.—Silas R. Divine and Charles A. Seely, New York City:

We claim the apparatus and its modification, substantially as herein described.

We also claim the combination of the shell, A, with the pipe, B, and the gutter, C, substantially as described.

55,072.—Rain Water Cut-off.—L. W. Doty, Aurora, Ill.:

I claim the gate, E, and spring, d, in combination with the partition, D, arranged relatively with the induction pipe, B, and eduction pipes, C C', substantially as and for the purpose set forth.

55,073.—Conposition for Lining Barrels.—Alpheus C. Dunn, New York City:

I claim a composition substantially as herein described of gum copal, boiled linseed oil, and an aqueous solution of soda or potash, either with or without glue.

55,074.—Construction of Finger Bar for Harvesters.—Rufus Dutton, New York City:

I claim forming the finger bars of harvesting machines from a metallic piece rolled or formed by suitable machinery, of suffic ent width for two finger bars, and having the edges turned or rolled up, as described when such metallic piece or plate is made thinnest at its edge and increasing in thickness toward the center, substantially as and for the purpose set forth,

Second, Making in the center of such metallic plate a recess or thinner portion, for the purpose of facilitating the dividing or cutting such plate, substantially as set forth.

Third, Making the finger bar of harvesting machines wedge-shape, or increasing in thickness from the front toward the back side, and rolling or turning up its thinnest edge, substantially as and for the purpose set forth.

Fourth, The combination of the finger or finger bar, substantially as described, so that or by which the finger is braced and supported by the bar at the backend of the under side of the slot of the finger, substantially as and for the purposes set forth.

55,075.—Lamp.—Michael B. Dyott, Philadelphia, Pa.:

I claim the air deflecting drip cup, E, constructed and arranged so as to operate in combination with the bowl, C D, and the shell A B, of a lamp, substantially as and for the purpose described.

I also claim the combination of the screen F, with the said drip, E, and the opposite sides of the shell, A B, substantially as and for the purposes described.

55,076.—Beer Pitcher.—Winslow P. Eayrs, Nashua, N. H.:

I claim the arrangement of the divisional plate, B, perforated plate, C C' C'' D D' D'', as described, mouth, o b, in combination with the pitcher, A, constructed and operating in the manner and for the purpose herein specified.

55,077.—Roller for Wringer Machines.—S. M. Emerson, Seville, Ohio:

First, I claim the hollow slotted cylinder, A, constructed as herein described in combination with the wedges, D, and with the rubber, C, substantially as and for the purpose set forth.

Second, The combination of the central band, E, with the cylinder, A, wedges, D, and rubber, C, substantially as described and for the purpose set forth.

Third, The combination of the washers or ferrules, F, constructed as described with the cylinder, A, substantially as and for the purpose set forth.

55,078.—Numbering Stamps.—David Emonnot, New York City:

I claim the type-carrying wheels No. 6, the ratchet wheels, 7 and 9, the pawls, 10, 11, 11', and spring catch or trigger, 13, in combination with the guides, 17 and 19, and the spring mounted shaft, 15, operating together in the manner substantially as and for the purpose set forth.

55,079.—Furnace.—William Ennis, New York City:

First, I claim, in a furnace having a downward draft, the introduction of the steam above the grate in such a manner that it may pass downward through the burning fuel and through the grate, substantially as and for the purpose herein set forth.

Second, The tubular steam generating grate and the elevated steam chamber in combination with a chimney below the grate, substantially as and for the purpose herein set forth.

55,080.—Steering and Turning Apparatus for Vessels.—Caleb G. Forshey, Washington County, Texas:

First, I claim the application of a rotary steering apparatus to a portable frame, C, which is so constructed that it can be readily applied to or removed from the side of a vessel at pleasure, substantially as described.

Second, The construction of the supporting frame, C, so that it shall be self-holding when applied to the side of a vessel, substantially as described.

55,081.—Steam Trap.—William Fuzzard, Chelsea, Mass.:

I claim the buoyant stopper, C, in combination with the exhaust chamber, A, and a suitable seat, B, in said chamber, substantially as and for the purpose described.

55,082.—Turbinate Force Pump.—J. H. A. Gericke, New Orleans, La.:

First, I claim a turbinate wheel inclosed as shown, with three systems of vanes or paddles, D E F, substantially as described.

Second, The fixed case, H, over the tubinate wheel or engine which drives the water upward, fitted with three different systems of curved vanes to direct the water toward the center of the said case, substantially as described.

Third, Separating the column of water in the case, H, and above it from the turbinate wheel above described by means of a fixed plate, M, substantially as described.

55,083.—Hay Loader.—Charles Gibbs, Pittsfield, Vt.:

First, I claim the loader, P, constructed substantially as described, in combination with the hay frame of a wagon or cart for the purpose set forth.

Second, The combination and arrangement of the pulleys, S' W and U, the arms, O S and T, and the rope, R, with each other and with the hay frame, substantially as described and for the purpose set forth.

Third, The combination of the pulley, U, ratchet wheel, X, stop, B', spring pin, G', and pawl, A', with each other and with the whole of the wheel of the wagon or cart, substantially as described and for the purpose set forth.

Fourth, The combination of the levers, D' and F', the bar, E, pin, G', and spring, I, with each other and with the pawl, A, and hay frame, substantially as described and for the purpose set forth.

55,084.—Harvester Cutter.—Sewell Gillam, New York City:

I claim the arrangement of the pitman, a, and crank, d, pitman, b, and crank, c, in combination with the sickles, A and B, operating in the manner and for the purpose herein specified.

55,085.—Refrigerator.—John C. Gove, Cleveland, Ohio:

First, I claim the frame, D, with slats, G, slides, E and F, with spring, d, constructed, arranged, and used as and for the purpose herein set forth.

Second, The box, A, ice box, B C, with shutter frame, D, constructed in the manner, substantially as and for the purposes herein specified.

55,086.—Socket Joint for Oil Tools.—Robert Gracey, Pittsburgh, Pa.:

I claim the use of the swivel-head, d, key, g, and key seats, o and b, when used in combination with the male and female parts of the joint and the sleeve or band, e, the whole being constructed, arranged, and operating, substantially as herein described and for the purpose set forth.

55,087.—Cement Roofing.—William Green, Cleveland, Ohio:

I claim the herein described cement roofing made substantially as set forth, for the purpose specified, being a new article of manufacture.

55,088.—Buckle.—Adam Hagny, Keokuk, Iowa:

I claim an improved trace bucale formed by combining the two tongues, G and I, constructed and arranged as herein described, with each other and with the frame of the buckle, substantially as and for the purpose set forth.

55,089.—Toy Spring Gun.—Albert Hall, New York City:

The coiled wire, b, cord, plate, r, and spring, m', arranged and operating in relation with the barrel, B, and case, C', as herein shown and described.

55,090.—Sheep Rack.—Lester Hall, Richfield, Ohio:

I claim the arrangement of the grain trough, C, tubes or pipes, D, manger, E, and trough, L, with the adjustable rack, F, door, G, and frame, constructed as and for the purpose described.

55,091.—Portable Field Fence.—Manley Hall, Richfield, Ohio:

I claim the arrangement of the panels, or sections, A B C, and posts, D, so connected to said sections as to lock them together, in combination with the cross pieces, G, and stakes, d, in the manner and for the purpose set forth.

55,092.—Rotary Steam Engine.—Samuel G. Hall and Geo. W. Bugbee, Norwich, Conn. Antedated May 21, 1866:

First, We claim the valves, e, in the body of the piston wheel, B, in combination with the slides, D, substantially as and for the purpose specified.

Second, The friction rollers, h, and intervening blocks, i, in combination with heads, f, of the piston wheel and with annular grooves, g h, the cylinder head constructed and operating substantially as and for the purpose set forth.

Third, The annular grooves, g', in the heads, f, of the piston wheel, in combination with corresponding projections, l, rising from the quadrants composing said piston wheel, substantially as and for the purpose described.

Fourth, The thin layer of Babbitt's metal, or other suitable material, fitting steam-tight into the end of the cylinder, in combination with one of the cylinder heads, with adjusting screws, m m', substantially as and for the purpose specified.

Fifth, The pipes, p p', with branches, g g* q' q'*, in combination with the openings, t t t' t'*, in the valve, G, and with the valve chamber, F, and steam and exhaust pipes, r s, substantially as and for the purpose set forth.

55,093.—Wheel Cultivator and Gang Plow.—William Hammond, Marshall, Mich.:

I claim the employment, independently, or in connection with each other, of the bent axle, bearing levers, L, in combination with the mulcram pins, F and adjustable stop-gage plates, G, connected and arranged relatively to, and with the frame and wheels of a cultivator, or gang plow, substantially as and for the purpose herein specified.

55,094.—Car Ventilator.—George Hardy, Lawrence, Mass.:

I claim the vibratory ventor, E, constructed as described, and its combination and arrangement with a passage, c, leading into a car or structure to be ventilated, and with the guard, A, made and arranged with respect to the said ventor and passage, as hereinbefore explained.

55,095.—Shutter Fastening.—John Harrar, Philadelphia, Pa.:

I claim the combination of the coupling shanks, B and C, and their respective parts, the pin, p, throat, t, and holes, n n, with the shanks, A A, and their respective parts, the slits, S' S, rest holes, r r, and the arrangement of the spindle and its parts, D e i g h i m and K, to operate together, substantially in the manner and for the purpose herein set forth.

55,096.—Mode of Attaching Handles to Tools.—George W. Harris and Andreas Franz, New York City:

We claim the ombination of the counter-sunk shoulders, B, the wedges or keys, figs 2 2' and 2'', and the clamp or ring, E, as and for the purpose herein set forth.

55,097.—Blocks for Polishing and Glossing Watch Hands.—George Hastings, Waltham, Mass.:

I claim as my invention, the carrier, constructed substantially as described, and also the employment of such carrier, or its equivalent, in manner, and for the purpose, as herein explained.

55,098.—Machine for Raking and Loading Hay.—A. W. Heany, Doylestown, Pa.

I claim the arrangement of the frame, C, shafts, R F O, heads, H, teeth, I, rearwardly inclined, rotating straps, S, and toe b, T, all located at the front of a wagon, and operating in the manner and for the purposes set forth.

I also claim the heads, H, rod, J, and arms, K K, connected by a rod, L, in connection with the driver's seat, M, all arranged to operate in the manner substantially as and for the purpose set forth.

55,099.—Sawing Machine.—Luman F. Heath, Lansing, Mich.:

First, I claim the spring, q, constructed and operating in the manner and for the purpose herein set forth.

Second, The combination of the spring, q, the platform, p, the rods, t, and cross bar, M, for operating a saw in the manner herein described.

55,100.—Screw Wrench.—John Hegarty, Jersey City, N. J..

I claim the arrangement of the cross piece, A, fixed jaw, C, sliding jaw, D, and screw, E in relation with each other, and with the shank, B, substantially as herein specified.

55,101.—Stove Pipe Damper.—Milan Hicks, Richmond, Ill.:

I claim the band I, concave plates, A A', perforated plates, B B' and C, constructed and arranged substantially in the manner and for the purposes herein set forth.

55,102.—Lifting Jack.—Aaron Higley, South Bend, Ind.:

I claim the link, D', pivoted to the standard, A', and lever, B, hinged to said standard by the straps, E, and plates, C, and to the base, A, by the shaft, a, and staples, a', in combination with the rack, C, and bands, C', arranged as and for the purpose set forth.

55,103.—Knitting Machine.—Jonas Hinkley, Norwalk, Ohio:

First, I claim an eye pointed needle, (for carrying a thread or yarn,) a work supporting comb, (on which which the work or fabric is set up or supported) and a looper or looping mechanism (by means of which the stitch or loop is taken from the needle and conveyed to or deposited on the comb), or the irequivalents, combined to operate for the production of knit fabrics, substantially in the manner set forth and specified.

Second, I also claim an organism or combination consisting of an eye-pointed needle, a work-supporting comb, and a looping mechanism, substantially and as described, and a traversing mechanism by which traversing movements of the said comb may be produced, essentially in the manner and for the purposes set forth and specified.

Third, I also claim an organism or combination consisting of an eye-pointed needle, and a work-supporting comb, and a looping mechanism substantially such as described, and a tension mechanism, by means of which a proper friction or tension is exerted on the yarn or thread while in the act of being knit, as and for the purposes set forth.

Fourth, I also claim an organism or combination consisting of a work-supporting comb and traversing mechanism, substantially such as described, and a slipping mechanism, by which the movements of the said comb may be reversed in the manner and for the purposes shown.

Fifth, I also claim an organism or combination consisting of a work-supporting comb, and its traversing mechanism, substantially such as described, and a detent mechanism, which operates to detain or hold the comb while the loop or stitch is being formed, in the manner and for the purpose sect forth.

Sixth, I also claim an organism or combination consisting of an eye-pointed needle, a work-supporting comb, and a looping mechanism, substantially such as described, and a cast-off mechanism, by which the loop is pushed from the tooth, in manner and for the purposes set forth.

Seventh, I also claim an organism or combination consisting of an eye-pointed needle for carrying the yarn being used, a work-supporting comb, on which the work is set up or supported, a looping mechanism, by which a loop or loops are taken from the needle and conveyed to or deposited on the comb, a traversing mechanism, by which traversing movements of the comb are produced, a shipping mechanism by which the traversing movements of the comb are reversed, a detent mechanism, by which the comb is held while the loop is formed, and a cast-off mechanism, by which the loop is pushed from the tooth of a comb, and a tension mechanism by which tension is applied to the yarn, the said instrumentalities, parts, or mechanisms being substantially as hereinbefore described, and combined and used for the production of knit fabrics, essentially in the manner set forth and specified.

Eighth, I also claim the combination of a work-supporting comb, substantially such as described, and a device by which the shipping mechanism may be automatically operated, essentially in the manner and for the purposes set forth.

Ninth, I also claim the combination of a work-supporting comb, substantially such as described, and an index mechanism or means, as explained (or its equivalent) for indicating at what point the movement of the comb will be reversed, substantially in the manner and for the purposes specified.

Tenth, I claim the arrangement or application of the rod, a2, with the comb teeth, in such a manner as to traverse therewith, substantially in the manner and for the purposes specified.

Eleventh, I claim a work-supporting comb, constructed with a rod, a2, and a rack and teeth, substantially as set forth and described.

Twelfth, I claim the combination of a work-supporting comb, substantially such as described, and a slotted or grooved end or piece of metal, S', or its equivalent, so arranged or disposed in relation to the comb, that the teeth of the comb may pass through the groove or slot, whereby the loops, especially in the vicinity of the needle, will be more securely kept upon the said teeth, substantially as and for the purposes set forth.

Thirteenth, I claim the bracket, t2, for supporting or holding the parts disposed in or upon the same, as constructed and arranged, substantially as described.

Fourteenth, I also claim a combination composed of an eye-pointed needle, or a work-supporting comb, substantially such as described, and a guard mechanism, by which the discharged loop is prevented from being carried too far from the comb, by the advancing needle, as described.

Fifteenth, I also claim a combination consisting of a work-supporting comb, an eye-pointed needle, and a looper, substantially as described, and the projecting piece, 6', or its equivalent, so arranged as to prevent the needle from being sprung upward by the action of the looper, substantially as described.

Sixteenth, I also claim a combination consisting of an eye-pointed needle, a work-supporting comb, a looper substantially such as described, and a spring finger, S2, for assisting in the conveyance of the loops from the needle to the tooth, as specified.

Seventeenth, I also claim the finger, S2, so constructed and arranged as not only to assist in conveying the loop as stated, but also to act as part of the guard mechanism, substantially as and for the purpose set forth.

Eighteenth, I claim a guard mechanism, one part of which is a spring so arranged that it will yield to admit of the use of a large or small needle, as circumstances may require, substantially as shown.

Nineteenth, I claim the combination of the cast off, G, directly with the needle carrier, so as to be operated by it in the manner set forth and described.

Twentieth, I claim the combination of the tension spring, E, directly with the needle carrier, so as to operate with and be operated by it, substantially in the manner shown.

Twenty-first, I claim the combination of the arm or detent, H directly with the needle carrier, so as to be operated by it, substantially in the manner set forth.

Twenty-second, I claim the combination and arrangement of an eye-pointed needle, A, a tension mechanism or spring, E, a cast off, G, and a detent, H, or their equivalents so that any two or more of them will have but one carrier, substantially as set forth and described.

Twenty-third, I claim the extension of the tension spring, E, back to the pitman or rod, h, so that the same may also act to keep the said rod on the crank wrist, substantially in the manner shown and specified.

Twenty-fourth, I claim the needle carrier and looping mechanism, so combined and arranged with respect to each other that the looping mechanism will be operated by the needle carrier, substantially in the manner set forth.

Twenty-fifth, I claim the needle carrier as constructed with a cam-shaped slot; i2, or its equivalent, for operating the looping mechanism, substantially as shown.

Twenty-sixth, I claim the combination of the slot, i2, tri-armed lever, f2 stud, l2 looper rod, c2, cam groove, k2, cam groove, p2, projection, r2, and stud, q2, or their equivalents, for producing the compound movement of the looper, substantially as set forth and described.

Twenty-seventh, I claim a looping mechanism, considered or taken as a whole, constructed and operating substantially as set forth and specified.

Twenty-eighth, I claim the combination and arrangement of the socket, t, 20, or its equivalent, with the cluten shaft, or its crank, for connecting the spool or bobbin to the said shaft, preparatory to filling it, substantially as described.

Twenty ninth, I claim a narrowing and widening mechanism, consisting of the rod, w, the pins, x' x' the slide rod, q' provided with projections, p' p' and s' to operate with the pins, x' x', and clutch lever, o', or their equivalents, substantially as set forth and described.

Thirtieth, I claim the application of the shipping pins, x' x', directly to the index plates y' y', substantially in the manner and for the purposes specified

Thirty-first, I claim the means of holding or keeping the loop on the tooth until the needle has fairly entered the loop, such being effected by the looper itself, substantially in the manner set forth and described.

Thirty-second, I also claim a combination composed of an eye-pointed needle, a tension mechanism, a work-supporting comb and a looping mechanism, substantially such as described, and a yarn guide, arranged and used in the manner and for the purposes specified.

Thirty-third, I claim the peculiar construction of the eye-pointed needle, that is the bent or crooked form described, so that the old loop may have room to pass back under the tooth when said needle is arranged, and used substantially in the manner set forth.

Thirty-fourth, I claim the arch, k', or its equivalent, arranged with respect to the comb, as shown, for supporting the plate, l, and bracket, t2, substantially in the manner set forth.

Thirty-fifth, And finally, I claim a knitting machine, composed of all the instrumentalities hereinbefore mentioned, or their equivalents, when constructed, combined and used substantially in the manner and for the purposes specified.

55,104.—Car Coupling.—William W. Hinman and William W. Neville, Jackson, Ill.:

We claim the frame or draw head, C, which contains the spring hooks, H H, secured within the frame, B, attached to the under side of the car, substantially as shown, to admit of the vertical and horizontal movement thereof, in connection with the vertically sliding frame, L, arranged as shown, or in any equivalent way, for the purpose of adjusting the frame or draw head, C, higher or lower, as may be desired.

55,105.—Nail Extractor.—J. H. Hogan, St. Louis, Mo:

I claim the combination of the handle, A, the slide, B, and the nippers, C, substantially as described and set forth.

55,106.—Beverage.—E. G. Holland, Union Springs, N. Y.:

I claim the aforesaid discovery of making wine, vinegar, and brandy, from the properties of the sumach drupes or berries.

55,107.—Screw Wrench and Hammer.—L. S. Hoyt and E. G. Hoyt, Croton Falls, N. Y.:

We claim the implement herein described, having at one end of its shank, A, a hammer, C, and at its other end a stationary jaw, B, in combination with the adjustable spring jaw, D, as a new article of manufacture.

55,108.—Carriage Plow.—A. Ingalls, Independence, Iowa:

I claim the lever, m, standard, E, rod, J, pulleys, p, n', in combination with the chain or cord, I, guide plate, D, and plow arranged, substantially as and for the purpose set forth.

55,109.—Screw Wrench.—Joel C. Jackson, Rochester, N. Y.:

I claim the sectional screw rack extending from the bracket, c', of the moving jaw, c, and occupying a groove in the bar, b, in combination with the nut, g, surrounding said bar, b, contiguous to the socket, h, substantially as set forth.

55,110.—Process of Coloring Wood, Etc.—Barton, H. Jenks, Bridesbury, Pa.:

I claim the process substantially as described of injecting wood and other porous substances with coloring matter.

Also, The new manufacture of wood, prepared substantially as described.

55,111.—Mode of Treating Wood for the Manufacture of Carding Engines.—Barton H. Jenks, Bridesburg, Pa.:

First, I claim the construction of the cylinders and rollers of carding engines of wood, which is impervious to the action of moisture, substantially as described.

Second, Applying card clothing to the base or backing which is composed of a combination of wood and paraffine or other equivalent substances, substantially as described.

55,112.—Whiffletree.—Niles Johnson, Ripon, Wis.:

I claim the clevises, C' C' arranged with the doubletree and whiffletrees, as and for the purpose herein set forth.

55,113.—Buckle.—George R. Kelsey, West Haven, Conn.:

I claim the combination of the bow and lever, Figs. 3 and 4, when the two parts are constructed, put together and fitted for use, substantially as herein described.

55,114.—Amalgamator.—Washington Kendrick, New York City. Antedated May 14, 1866:

First, I claim the use for amalgamating and separating ores of a tubular heater, E, provided with suitable pipes for injecting and discharging wet or superheated steam or hot air in combination with the tank, A, constructed and operating substantially as and for the purpose set forth.

Second, The agitator, F, in combination with the tubular drum, E, and tank, A, constructed and operating substantially as and for the purpose described.

55,115.—Adjusting Door Knob to Spindles.—Thomas Kennedy, Branford, Conn. Antedated May 20, 1866:

I claim the combination of the nut, D, and spindle, E, with the rose, G, and neck, F, constructed and arranged with the projections, a a, and notches, c c, substantially in the manner and for the purpose specified.

55,116.—Wool Press.—P. B. Killam, Alma, Mich.:

I claim the arrangement of the shafts having wheels or pulleys, or their equivalents, connected together by a chain or belt, knuckle jointed levers for raising and lowering the leaves of the table, in combination with any suitable device for holding the leaves in an upright position, substantially as herein described and for the purpose specified.

I also claim the combination of the fixed and movable guards when arranged together, and so as to operate in the manner and for the purpose specified.

I also claim the use of the catch buttons for holding one end of the binding cords for the twine as described.

55,117.—Bent Lever Scale.—Jacob King, Jr., Fort Wayne, Ind.:

I claim an improved lever weighing scales formed by combining the lever, F, scale pan, G, cog wheels, K and L, and index, J, with each other, and with the frame of the scales, substantially as herein described and for the purpose set forth.

55,118.—Picker House for Opening and Cleaning Cotton, Etc.—Richard Kitson, Lowell, Mass.:

I claim the hollow walls or flues, B B, and openings, C, in combination with the enclosed spaces between the beams, or their equivalents, the whole arranged substantially in the manner and for the purpose specified.

55,119.—Attaching Sole to Horseshoes.—A. H. Knapp, Coxsackie, N. Y.:

I claim the combination of the spring frame, B, lips, b, and web, C, applied relatively with the recessed shoe, A, in the manner and for the purpose herein specified.

55,120.—Churn Power.—David J. Knapp, Fallsburgh, N. Y.:

I claim the slide, G, fitted in suitable guides or a slot in a standard or support, H, with the pitman, F, passing through it substantially as shown and described, in combination with the gearing and spring, all arranged to operate in the manner substantially as and for the purpose specified.

55,121.—Coin Holder.—Norbert Landry, San Francisco, Cal.:

I claim the arrangement of coins and medals upon a vertical inclined or horizontal axis, between or upon transparent substances, to be revolved at pleasure, for the purpose of displaying said coins or medals, substantially as herein described and set forth.

55,122.—Steam Engine.—Finly Latta, Cincinnati, Ohio:

I claim the arrangement of the direct steam passages in combination with steam cylinders of unequal diameter, in a steam engine, adapted to operate, as and for the purpose set forth.

55,123.—Medical Compound.—H. H. Lockwood, Madison, Wis.:

I claim as a new article of manufacture, the medicine herein described.

55,124.—Self-acting Decanter Stopper.—Louis Loeffler, East Cambridge, Mass.:

I claim the self-acting ball valve decanter stopper as made with the series of fingers applied to the valve seat tube, and so as to extend therefrom and about the ball, when in places substantially in the manner as hereinbefore specified.

55,125.—Leather Dressing Machine.—S. C. Lord, Portland, Oregon:

First, I claim the arrangement of the duplicate legs, c, cross bars, f, slotted arms, g, shaft, h, arms, i, connecting rods, m, lever, n, and notched bar, O, in combination with the table, A, and supporting legs, a, constructed and operating in the manner and for the purpose herein specified.

Second, The arrangement of the spring shoe, F F, having stickers, x x, and levers, u u, for raising or lowering the same, the whole being arranged together in a common frame, D, of a cross head, C, and operating as and for the purpose specified.

Third, In combination with the above the roller a2, with its standards, b2 b2, spring, c3, and lever, d3, arranged together substantially in the manner and for the purpose set forth.

Fourth, The combination of the hangers, and slides, B, with the cross head, C, and its frame, D, connected with the driving shaft, through a pitman, rod, g2, so as to operate in the manner specified.

55,126.—Fastening Key in Locks.—S. B. Loughborough, Canandaigua, N. Y.:

I claim the employment or use of the safety bars, b, constructed substantially as and for the purpose herein shown and described, in combination with the clamping wedge, w, or its equivalent.

55,127.—Safety Valve.—Addison Low, Albany, N. Y.:

First, I claim the combination of the measuring valve, H, with the piston, F, for the purpose herein set forth.

Second, The combination of the piston, F, with the safety valve,

D, and the measuring valve, H, as and for the purpose described.

Third, The combination of the piston, F, lever, E, lever, G, and safety valve, D, as and for the purpose named.

Fourth, The combination of the measuring valve, H, with the piston, F, lever, G, and safety valve, D, as and for the purpose set forth.

55,128.—Fruit Jars.—Joshua R. Lupton and M. E. Lupton, Stafford, Ohio:

We claim an improved fruit can stopper, formed by combining an india-rubber or equivalent surface or lining with a wooden or metallic cap, constructed and applied substantially as herein described and for the purpose set forth.

55,129.—Farm Gate.—D. F. Luse, Spring Mills, Pa.:

I claim the shoulders or offsets, d d, and f f, in the bar, H, and post, A, so as to allow the pivoted rails, C D D, to shut by each other, in folding, substantially as and for the purpose set forth.

55,130.—Water Indicators for Steam Generators.—George Lutz, Lancaster, Ohio:

I claim the rod, I, incased within a tube, J, and hung at its lower ends to the float rod, G, and at its upper end hung to the crank arm, O, of the shaft, P, in combination with the sector rack, T, of shaft, P, interlocked with the pinion, V, of the index spindle when arranged together, substantially in the manner described and for the purpose specified.

55,131.—Sash Fastening.—John Lydy, Georgetown, Ohio:

I claim the combination and arrangement of the pawls, D and D', the serrated plates, C and C', the plate, I, and the springs, a and a', substantially as herein described and shown, and for the purpose specified.

55,132.—Gages for Augers.—Samuel L. Syford, Portland, Me.:

I claim a gage for bits and augers composed of two pieces, A A, formed to fit the faces of the twisted blade of the bit or auger, so as to turn with the spiral twist, and adjustably united by set screws, substantially as and for the purpose set forth.

55,133.—Car Truck.—Theodore Lyman, Sandusky, Ohio:

I claim the combination of the braces, O P U V, and block, R, with the swing beam, D, of an ordinary railroad car truck, substantially as described and for the purpose set forth.

55,134.—Atmospheric Governor.—Benjamin Mackerley, Paint, Ohio:

I claim an atmospheric governor composed of a cylinder, A, with two pistons, B C, and brake, D, arranged substantially as and for the purpose described.

55,135.—Mop Handle.—Henry B. Malbone, Middletown, Conn. Antedated May 21, 1866:

I claim the cloth holder for mop handles herein described, when constructed and arranged substantially in the manner set forth.

55,136.—Hydrants.—Ruben A. McCauley, Baltimore, Md.:

I claim the combination with the elbow seat, c', of the chamber, d, the strainer and supporting disk, j'', spring, i, holding cap, h, elastic ball, g, and pipe, F, arranged and operating substantially as described and for the purpose set forth.

55,137.—Manufacture of Casks, Barrels, and Kegs.—Joshua Merrill, Boston, Mass.:

I claim the improved cask, substantially as described, having its joints made with tongues and grooves, substantially in the way and for the purpose herein before described and set forth.

Also in combination with the joints of a tongue, d, and grooved cask a coating or stuffing of glue or simular gelatinous cement in the joints, substantially as hereinbefore described.

55,138.—Regulating the Draft of Furnaces.—Albert H. Mershon, Philadelphia, Pa.:

I claim the ash-pit door and draft door, the chain, H, pulleys, K K, and weight, with the door and index gage when combined and constructed substantially as and for the purpose herein described.

55,139.—Apparatus for Parlor Croquet.—William S. Messinger, Roxbury, Mass.:

First, I claim the wickets, f, or stakes, i, with their sockets, D or E, in combination with the cloth, B, perforated to receive them, substantially as set forth.

Second, I also claim the perforated cloth, B, and frame, C', in combination with the wickets, f, and stakes, i, and their removable sockets, D and E, substantially as described.

55,140.—Cheese Hoop.—Henry W. Millar, Utica, N. Y.:

I claim a cheese hoop made of wood, hooped with iron bands, the inner surface whereof is lined with a metallic lining, as hereinbefore described, my invention consisting in the application of the metallic lining.

55,141.—Washing Machine.—John Miller, Russellville, Ky.:

First, The combination of the loose balled drum, with the loose balled frame, constructed, arranged and operating substantially as set forth.

Second, The combination of the furnace trough, drum and frame, when constructed, arranged and operating as described, for the purpose set forth.

55,142.—Seeder and Cultivator Combined.—John Miller, Russellville, Ky.:

I claim the combination of a cultivator which furrows and forms the ridge, with a planter that plants, covers, and finishes the ridge with a smooth, flat surface, all in once passing over the ground, substantially as set forth.

55,143.—Street Lamp.—Jacob G. Miner, Morrisania, N. Y.:

First, I claim a cylinder, or its equivalent, when sustained, substantially as described.

Second, I claim the combination of cylinder frame and lid, for the purpose set forth.

55,144.—Auger.—Henry P. Moody, Newburyport, Mass.:

I claim the removable centring plug, D, in combination with the bit or auger, A, for the purpose set forth.

55,145.—Kettle Bottom.—Charles A. Moore, West Brook, Conn.:

I claim the above described improvement in kettle bottoms, formed substantially as specified, and for the objects set forth.

55,146.—Brick Machine.—Isaac Morley, Pittsburgh Pa.:

First, The reciprocating slide, I, and plunger, K, arranged and operating in connection with the hopper, A, as and for the purpose set forth.

Second, The combination and arrangement of the wheels, F and G, and the eccentrics, E, for the purpose of operating the slide, I, and plunger, K, as shown and described.

Third, The frames, d, for the purpose of holding the molds in position while being filled and having the wire, h, arranged, as described, for cutting of the brick, as set forth.

Fourth, The wheel, B, constructed as shown, and arranged to operate in connection with the screws, C, as described, for the purpose of elevating and depressing the frames, d, at the required intervals.

Fifth, I claim the combination and arrangement of slide, I, plunger, K, and frames, d, to operate in connection, and at the proper intervals, substantially as herein shown and described.

55,147.—Ship Pump.—George Moulton, Jr., Bath, Me.:

I claim arranging the valves in or over the pump, tube, or pipe, in combination with an open top above the valve, and a piston working in an auxiliary cylinder, substantially as described, so that the pump may be sounded by removing the valves, without removing or disturbing the piston.

55,148.—Brick Machine.—Charles Murtha, Philadelphia, Penn.:

First, The intermittingly rotating cylinder, H H, provided with blades or knives, I, in connection with the endless carrier, K, said parts being arranged in relation with a mud mill, substantially as and for the purpose set forth.

Second, The plate, M, suspended on pivots above the endless carrier, K, to operate in connection therewith, and the sanding device, substantially as and for the purpose specified.

Third, The intermittingly rotating block, F, provided with a series of radial molds having plungers, R, fitted within them, and arranged in relation with the endless carrier, K, substantially as and for the purpose set forth.

Fourth, The cap, S, operated in the manner shown, or in an equivalent way, and arranged in relation with the block, P, so as to impart an intermittingly rotating movement to the block, and at the same time serve to confine the clay molds while the clay is under pressure therein, substantially as set forth.

Fifth, The heating of the molds by steam, substantially in the manner and for the purpose as set forth.

55,149.—Surface Condenser.—Joseph Nason, New York City:

I claim the within described construction and arrangement of the plates, 1 2 3, etc., and coinciding holes, G H, etc., whereby one of the fluids is allowed to flow freely through the holes into and through alternate spaces, m m, etc., between the plates, and prevented from communicating with the intermediate spaces, h h, etc., while the other fluid is allowed to flow through said intermediate spaces, substantially in the manner and for the purposes herein set forth.

55,150.—Fruit Gatherer.—Eliza H. Newcomb, New York City:

First, I claim the employment in a fruit gatherer of converging blade, b b, applied to the frame or ring, A, and operated by the simple withdrawal of the fruit gatherer, substantially as described.

Second, I claim the combination of the ring, A, converging blades, b b, curved slats, m m, pins, n n, and spring, e, by means of which a shear action of the converging blades is obtained by the simple withdrawal of the fruit gatherer, substantially as described.

Third, I claim the combination of the hinged frame, A, either square or circular, with four points or more converging blades, b b, and springs, by means of which a shear action of the converging blades is obtained by the simple withdrawal of the fruit gatherer, substantially as described.

55,151.—Apparatus for Preserving Beer.—A. F. Neynaber, Philadelphia, Pa.:

I claim the method of preserving beverages or fermented liquors, as lager beer, ale, porter, etc., in air-tight india-rubber vessels, and discharging them liquors therefrom in parts, by means of compressing the vessel by weight, in such a manner as to avoid the admission of any air, substantially as set forth in the foregoing specification.

I also claim the construction of the beer keeper, by the application, combination, and arrangement of the india-rubber vessel, A, inlet, i, with plate, m, screw, n, and bar, o, outlet, j, with valve, k, tap, l, and pressure, r, frame, B, with ring, s, presser, C, with pulleys, j' j', and stand, D, substantially in the manner and for the purpose as herein described

These claims I make jointly and separately.

55,152.—Grain Screen.—Harrison Ogborn, Richmond, Ind.:

First, I claim the crooked groove, S, in combination with the friction rollers or pulleys, n n, and arms, m m, when used for the purposes set forth.

Second, The perforated crank, c, shaft, b a, and hopper, A, in combination with the nest of screens, D E and F, and crooked groove, S, when arranged and operated substantially as set forth, and for the purpose specified.

55,153.—Composition for Stiffening Felt Cloth.—Patrick O. Rork, Norwalk, Conn.:

I claim the union of alum with a solution either of shellac and borax, shellac and sal-soda, or shellac and ammonia, for the purpose of stiffening hats, hat bodies, hats for ladies' wear, and other articles, in which a greater degree of stiffness is required than the material used possesses of itself.

55,154.—Carpet Stretcher and Hammer.—F. M. Osborn, Dover Plains, N. Y. Antedated May 22, 1866:

I claim the combination, in one machine, of a stretcher, w, and hammer, o, arranged and operating with regard to each other, substantially in the manner described, and for the purposes specified.

I also claim the arrangement of the stretcher, w, hammer, o, with the intermediate parts or devices, connecting them with a common lever handle, g, substantially as and for the purpose set forth.

55,155.—Subterranean Reservoir for Wells.—Alonzo Palmer and John Bean, Hudson, Mich.:

We claim the arrangement of the cylinder, A, shaft, B, disks, S and S', together with the agitators, d d, when used as and for the purposes herein specified.

55,156.—Stump Extractor.—Alonzo Palmer and Robert Gilliland, Hudson, Mich.:

We claim the beams, A A, supporters, B B, clevis, F, stays, D D, lever, E, braces, C C, pulley, I, cord, H, and tongue, G, arranged in the manner substantially as and for the purpose herein set forth.

55,157.—Ratchet Wrench.—William Pierson, Newark, N. J.:

First, I claim the lever-like catch, D, applied as described, with a spring, f, in a mortise in the stock, and in combination with a circumferential groove, d, in the exterior of the ratchet socket, the whole arranged substantially as herein described

Second, The screw, s, in combination with the catch, D, substantially as and for the purpose herein specified.

55,158.—Manufacture of Caustic Alkali.—Louis Prang Boston, Mass.:

I claim the mode herein described of combining any alkali with lime in such a way as to obtain a powder to serve when dissolved as caustic lye.

55,159.—Process for Manufacturing Glass.—Samuel Richards, Philadelphia, Pa.:

I claim the manufacture of merchantable glass from impure cullet and common fluxes by first melting them and straining the impurities out of them and then taking the product and mixing it with a small portion of ordinary batch, substantially as described.

55,160.—Medical Compound.—Margaret Richardson, Norristown, Pa.:

I claim a medicine for the cure of cholera and other bowel complaints, made of the ingredients herein described and in about the proportions specified.

55,161.—Washing Machine—Charles Roberts, Lake Village, N. H.:

I claim a washing machine composed essentially of a concave of concentrically arranged rollers, I I, nearly touching each other, except a wider space at the top, for the introduction of the clothes, and having a cylinder, c, with elastic or yielding pressure bars, revolving inside thereof, the whole to be placed within a tub, or other vessel holding water or suds, substantially as herein specified.

I also claim giving the rolls, I I, a positive revolving motion nearly equal to and in the same direction as the pressure bar surfaces of the revolving cylinder by means of pinions, J J, on said rolls, and a driving cog wheel, H, on the cylinder, or its shaft gearing into said pinions, substantially as herein set forth.

I also claim the arrangement of the stationary bars, F F, and yielding pressure bars, E E, in the heads of the cylinder, c, substantially as herein described.

55,162.—Swival Shackle.—Thomas B. Roach, Folsom, Cal.:

I claim the swivel shackle, constructed substantially as herein described.

55,163.—Training Hop Vines.—Benjamin C. Rogers, Stockbridge, Vt.:

I claim the arrangement of stakes and lines, substantially as herein described, and as represented by the accompanying drawing.

55,164.—Machine for Cutting Succulent Roots for Feed.—Elbert J. Roosevelt, Pelham, N. Y.:

First, I claim the combination of the curved knife, E, attached to the projection, G, of the arch, F, with the hopper C, the parts being constructed and operated substantially as and for the purpose herein recited.

Second, I claim the groove, M, for the entrance of the edge of the knife, and the lip, N, under the groove, for clearing the throat or space under the edge of the knife, as herein described.

55,165.—Burglar Alarm.—A. J. Ross, Rochester, N. Y.:

I claim the portable burglar alarm, made up of the combination of the alarm bell, C, and base plate, D, engaged and disengaged by simply changing the position, as described, and the cam plate, G, provided with a series of corrugations or cams, k k, for giving a succession of alarms, as herein set forth.

55,166.—Padlock.—Cyrus W. Salader, Newark, Ohio. Antedated May 24, 1866:

I claim securing the wards or guards, B, for the key, in the body of the lever, A, or its equivalent, in the manner and for the purpose substantially as set forth.

55,167.—Padlock.—Cyrus W. Salader, Newark, Ohio: Antedated May 24, 1866:

First, I claim the lever, S, or its equivalent, in combination with the lock bar, A, in the manner and for the purpose, substantially as shown and described.

Second, I claim the spring, B, or equivalent, in combination with the lever, S, and lock bar, A, in the manner and for the purpose substantially as shown and described.

55,168.—Heating and Ventilating Railroad Cars.—Thos. H. B. Sanders, Philadelphia, Pa.:

I claim the arrangement of air pipes, P, and registers, R, with hot or cold air chamber, c' c', of stove, S, and fan, B B, combined together as and for the purpose hereinabove described.

55,169.—Churn.—John F. Seaman, Cortlandville, N. Y.:

First, I claim the arrangement of bars, O and Y, in their connection with the lever, 2, and pendulum weight, L, for the purpose specified.

Second, I claim churning by an attachment to the bottom of a pendulum or pendulum-weight, as set forth, and for the purpose specified.

Third, I claim the arrangement of the springs, 2 and 3, as set forth, and for the purpose specified.

55,170.—Carpet Holder.—E. Shopbell, Ashland, Ohio:

I claim the combination of the cleats and button, when used in connection with the carpet and mop board, as and for the purpose set forth.

55,171.—Screw Cutting Machine.—Amos B. Simonds, Youngstown, Ohio:

I claim the combination and arrangement of the dies, H, movable jaws, F, and stops, J, constructed and operated as described, with each other and with the head, d', of the shafts, D, substantially as and for the purpose set forth.

Second, The combination of the spring, M, with the arms, f', of the movable jaws, F, substantially as described, and for the purpose set forth.

Third, The combination of the sliding conical block, L, gage rod, R, arms, F and N, and connecting bar, O, with each other, with shaft, D, and with movable jaws, F, substantially as described and for the purposes set forth.

55,172.—Steam Generator.—Andrew J. Smith, Greenville, Ohio:

I claim an improved steam boiler, formed by combining the perforated interior boiler, B, and the water induction pipe, D d' E, with each other, and with the outer boiler, A, substantially as described, and for the purposes set forth.

55,173.—Machine for Cutting Smoking Tobacco.—H. M Smith, Richmond, Va.:

I claim the fine steel or iron comb, made single or with two edges to reverse, in combination with the fine steel teeth in the cylinder, and in combination with the screen, operating for the purpose and in the manner as above described and set forth.

55,174.—Grain Cleaner.—Geo. Stevenson, Lionsville, Ind., and John J. Crider, Greenfield, Ind.:

We claim the combination of the outer drum screen and the inner casing, K K, provided with a revolving brush, the whole constructed and operated substantially as described and represented.

55,175.—Cultivator.—Amos D. Stocking, Dowagiac, Mich.:

First, I claim the application of a swivel wheel, a, to the rear end of the frame of a cultivator, which is constructed substantially in the manner described.

Second, Keeping the shovel standards, E, in proper position during their passage through the soil by means of the transverse rods, h', and notches, i, combined with the forward braces, k, substantially as described.

Third, The pivoted board, G, or its equivalents, arranged transversely across the cultivator frame, and connected to the shovel standard, E, substantially as described.

55,176.—Rotary Brush.—Silas Stuart, Sterling, Mass.:

I claim the perforated corrugated toothed cylinder, A constructed and operating in the manner and for the purpose herein described

55,177.—Tobacco Cutter and Nut Cracker.—Howard Tilden, Boston, Mass.:

I claim a tobacco cutter and nut cracker, having the operating lever in the form of the tail of a dog, or other animal, and the jaws that hold the nut corresponding to the mouth of an animal, the operating mechanism, or its equivalent, being contained in the case, H, as herein described.

I also claim the combination of the transversing knife or cutter, operated as herein set forth, with the jaw, V, and the case, H, constructed as herein set forth.

55,178.—Apparatus for Collecting Floating Oil from Streams.—Hamilton E. Towle, New York City:

First, I claim the combination with the squeezing roller of an apparatus, constructed as herein described, of a swinging apron or scraper, actuated by means of a spring, or equivalent mechanism, and arranged and operating as and for the purposes herein set forth.

Second, In combination with the squeezing roller and swinging scraper, as described, I claim the employment of a second scraper, arranged and operating as herein shown and set forth.

Third, In combination with the squeezing roller, I claim the lever arms, in which it has bearings, and the rods or bolts, by means of which the pressure of the roller may be regulated, the whole being constructed and arranged substantially as herein shown and described.

55,179.—Grain Cleaner and Separator.—B. T. Trimmer, Rochester, N. Y.:

I claim the special construction and arrangement of the machine, consisting essentially of the draught passages, d g h i, of the trunk, E, fan, C', shoe, H, beater chamber, G', and beater, M f, arranged and operating substantially as and for the purpose herein set forth.

I also claim the combination and arrangement of the passages, d g h i' uniting in a common discharge, having the turns or deflections, k t, and the pockets, m n, the whole forming a trunk that is connected with the top and bottom of the machine in such a manner as to form a circuit through, substantially as described.

I also claim exhausting both the inside and outside of the beater cylinder by the single fan, C', operating above, the whole arranged substantially as herein specified.

I also claim distributing the grain falling into the passage, i, from the trough g, by the wall, w, and floor, x, the whole arranged and combined as described.

I also claim making the beater cylinder in sections, 1 2 3 etc., and using the same in combination with the grooves, a a, and space, b', of the heads, I I', so that said sections may be applied or removed without removing the outer casing of the frame, substantially as specified.

I also claim forming the disks, M M, of the beater with the star points, having opposite sides, g' h', for attaching the wings, f f, in opposite angles, substantially as described.

55,180.—Air-cooling Ventilator.—Friedrich Villard, Mount Eaton, Ohio:

First, I claim the water grate, C D, constructed substantially as described, for distributing the water over a number of conductors.

Second, In combination with the distributing water grate constructed and adapted to operate as set forth, I further claim the two tanks, A G, and water elevator, J, for passing the water repeatedly over the evaporating surfaces, as explained.

55,181.—Quartz Mill.—C. Ph. Wagner, New York City:

First, I claim communicating an alternate reciprocating movement bodily to the lower end of the crushing jaws, I J, and at the same time a vibrating movement to the upper ends of said jaws, so as to produce a rubbing or guiding action and a crushing action combined employed for the purpose by means, substantially as described.

Second, Pivoting the lower ends of the vibrating jaws, I J, or their equivalents, on bearings which have a vertical vibration and communicating a lateral vibration to the upper ends of said jaws, by means, substantially as shown and described.

55,182.—Sewing Machine.—Albin Warth, Stapleton, N. Y.:

First, I claim the combination of the rakes, y w, teeth or pins, b'', slip weights, a', and adjustable dog, b', arranged and operating in the manner and for the purpose herein specified.

Second, The elastic pad, l, in combination with the needle slide, C, pendulum, b, and needle, n, constructed and operating substantially as and for the purpose set forth.

Third, The perforated flat sole shuttle, S, in combination with the shoe, G, and needle, n, arranged and operating in the manner and for the purpose herein described.

Fourth, The combination of the curved tail piece, l'', and shuttle-8, for the purpose herein described.

Fifth, The false shuttle, S', with tongue, e2, and hook, d2, in combination with the shoe, G, and needle, n, constructed and operating substantially as and for the purpose described.

Sixth, The cavity, b2 d2', in combination with the hook, d2, and needle, n, as described, so that the loop can be brought in such a position as to allow the needle to pass through it on its subsequent descent.

Seventh, The cavity, c2', located as shown, in combination with the sole of the shuttle and the shuttle race, constructed and operating substantially as and for the purpose set forth.

Eighth, The tracer, y2, and adjustable cloth guide, M, in combination with the design wheel, z2, and with a sewing mechanism, constructed and operating substantially as and for the purpose described.

55,183.—Lamplighters' Torch.—C. D. Walters and John Wilson, Harrisburg, Pa.:

I claim as a convenient article of manufacture the lamplighter's torch, herein described, as represented.

55,184.—Grain Drill.—Levi N. Warren, Milwaukee, Wis.:

I claim the inclined metallic aperture plate, K, or its equivalent, the metallic sub tube, p, with flexible joint, the attachment of the ground tubes, q, to the falling bar, x, all in combination.

I also claim the combination of the detachment rod and lever in elevating the ground tubes and detaching the gearing wheels at one operation, substantially as described and shown, and for the purpose set forth.

55,185.—Cultivator.—Timothy W. Webb, Springfield, Ill.:

First, I claim the construction of the frame, the timbers, A A, and cross bars, or timbers, B B B, so notched and halved together on an angle that the face of the cross bars, B, will place the straight standards, C C C C, in the proper inclination for supporting and bracing the plows or cultivators, substantially as herein described.

Second, I claim making corresponding series of holds, e e, through the cross bars, B B B for the purpose of bolting and bracing the cultivator standards, C C C C, so that the cultivators may be changed to work either right or left and the spaces adjusted between them, as and for the purposes herein set forth.

55,186.—Tweer.—Joseph Weller, Washington C. H., Ohio:

First, I claim the construction of a tweer of an annular chamber, B, surrounding a central throat which communicates with the double conical chamber, G, substantially as described.

Second, The construction of the plunger, H, with a head, b', cylindrical portions, b1 b2, and a reduced stem, b3, in combination with the chamber, G, substantially as described.

Third, The conical ring, J', applied within the throat of the tweer in combination with a contrivance for clearing the throat, substantially as described.

Fourth, The oscillating ring, J, provided with wings, e e, in combination with the plunger, H, substantially as described.

Fifth, Providing for giving a vertical, and also, an oscillating movement to the solid or hollow plunger, H, by means of a lever, K, substantially as described.

55,187.—Spring Bolt.—Gilbert D. Whitmore, Boston, Mass. Antedated May 20, 1866:

I claim the improved spring lock as made not only with the bolt-retaining mechanism or catches, g, h, with the handle, F, and the inclined or cammed slot, c, arranged together and with the bolt and the case and the spring of the bolt, substantially as described.

55,188.—Boots and Shoes.—Henry Wight, East Cambridge, Mass.:

I claim the within-described constructions of a boot or shoe consisting of the peculiar formation of the edge of the sole and the connection therewith of the vamp as shown with its edge turned outward, the sole and vamp being united by suitable fastenings driven through the upper into the sole at the bottom of the groove, also the employment of substantially the staple-formed fastening described in combination with the construction above claimed.

55,189.—Clinching Iron.—Daniel H. Williams, Antwerp, N. Y.:

I claim the above-described cylindrical clinching iron, having groove, A A and B B, substantially as set forth.

55,190.—Pipe Wrench.—William W. Mills, Janesville, Wis.:

I claim the combination and arrangement of the toothed jaw, F, sleeve, D, spring, A, jaw, B, screw rod, F, all constructed and operating in the manner and for the purpose herein specified

55,191.—Thill Coupling.—A. and G. Woeber, Davenport, Iowa:

First, I claim the construction of a slot, a, in thill iron, C', in the rear, and obliquely to the bolt, and the application of India-rubber, a', therein as arranged whereby the eye of the thill iron is thus made to have a bearing on the slip without any addition or device to either one or the other or heretofore, substantially in the manner and for the purposes as herein set forth.

Second, The application of the key, E, and strap, D, as arranged in combination with the bolt, c, substantially in the manner and for the purpose as herein set forth.

55,192.—Thill Coupling.—A. and G. Woeber, Davenport, Iowa:

First, We claim the application of a double-slotted key, E, as constructed and arranged in connection with the strap, g, as constructed and applied in combination with the grooved slide of the clip, B, and bolt, F, substantially in the manner and for the purpose as herein set forth.

The combination of the key, E, groove, f, and bolt, F, with the adjustable slotted metallic spring, D, substantially in the manner and for the purpose as herein set forth.

55,193.—Ordnance.—Lemuel Wellman Wright, Thorndike, Mass. Antedated May 16, 1866:

I claim an improved cannon or piece of ordnance as made with the breech, f, the central tube, a, and one or more series of tubes or concentric cylinders, arranged and combined substantially as specified, the whole being united or braced together in the manner substantially as set forth.

55,194.—Steam Bath.—J. Young, M. D. Williamsburgh, N. Y.:

I claim the arrangement within the cage, B, which supports the inclosing sheets, of the perforated steam chamber, A, with deflector plate, c, substantially as described and represented.

55,195.—Combination of Lenses for Photographic Purposes.—Joseph Zentmayer, Philadelphia, Pa.:

I claim a doublet made of uncorrected meniscus lenses of different spherical curvatures, arranged concentrically or nearly so, substantially in the manner and for the purpose specified.

Second, I claim the arrangement of a series of uncorrected meniscus lenses of different spherical exterior any two of which series when set concentrically, form a corrected, or nearly corrected doublet, substantially in the manner as specified.

55,196.—Supporter for Ladies' Skirt.—William Bachelier, West Newbury, Mass., assignor to himself and F. Bradbury, Charleston, Mass.:

I claim a skirt supporter, A, made of sheet metal or other suitable material, and in two parts or sections, secured together by a hinge having each of its wings or leaves fastened to the supporter sections in such a manner as to allow a vertical play or motion thereto, substantially as herein described, and for the purpose specified.

55,197.—Buckle Clasp.—Francis D. Ballou, Abington, Mass., assignor to Alfred B. Ely, Newton, Mass.:

I claim the buckle clasp, substantially as and for the purpose described.

55,198.—Shaft Coupling.—George L. Baum (assignor to himself and Herman A. Dobster), Bethlehem, Pa.:

I claim an improved shaft coupling formed by combining the shell, E, key, D, and set screws, F, with the ends of the shafts to be coupled, substantially as described and for the purpose set forth.

55,199.—Machine for Upsetting Wagon Tires.—Edward Cook (assignor to himself and Bradford Jones), Valparaiso, Ind.:

I claim in combination with the movable section, I, and the immovable section C, united by the long screw, H, the inclined clamps, K, D, and the anvil and clamping bars, M N, the whole arranged to operate substantially as herein described and represented.

55,200.—Vise.—Peter Crowl (assignor to himself and H. H. Finley), Boonsville, Pa.:

I claim, in combination with the movable jaw, A, having a rack upon the side of its stock, the ratchet, F, dog, D, lever, M, and springs, F and N, arranged and operating substantially in the manner and for the purpose set forth.

55,201.—Machinery for Printing Railroad Tickets.—William T. Cushing (assignor to Sanford Harann & Co.), New York City:

I claim in machinery for printing railroad tickets and other articles, the feeding roller, substantially as described, in combination with a series of pressure rollers or separate adjustable stocks, substantially as described, whereby tickets of different thickness can be printed at the same time and by the same machine.

Second, I also claim the one platen for receiving two series of forms of types in combination, with two adjustable beds, substantially as described, whereby the two series of impressions are obtained by the movement of one platen alone.

55,202.—Sawing Machine.—Branch W. Durkee, Livonica, N. Y., assignor to himself and J. Barns, West Lakeville, N. Y.:

First. I claim the arrangement in an adjustable frame of one, or more vertical, with one or more horizontal saws, substantially in the manner and for the purpose set forth.

Second, The combination of vertical and horizontal saws in an adjustable frame with the driving drum arranged and operating in the manner and for the purpose set forth.

Third, The combination and arrangement of the main carriage with the toggle lever mechanism and weight to render its reciprocating motions automatic, substantially as set forth.

55,203.—Blacking for Leather, Harness, Etc.—Thomas James (assignor to himself, John McCrellish, John Rogers, W. H. James, and C. H. White), Medford, Mass.:

I claim the within described improvement in blacking for leather composed of the materials specified, mixed in the properties, substantially as set forth.

55,204.—Cupola and other Furnaces.—Philip W. Mackenzie, Jersey City, N. J., and Charles W. Isbell, New York City, assignors to the Smith & Sayre Manufacturing Company, New York City:

First, We claim the two or more separate chambers, I I, arranged one above another around the lower portion of the furnace, and each communicating with a separate tweer, or series of tweers, for conducting the air into the same furnace at different levels, substantially as herein set forth, for the purpose specified.

Second, In combination with such air chambers, we claim the valves, u u, forming separate communications with the blast pipe for the purpose of admitting the air, and controlling or stopping the admission thereof to the several chambers, substantially as herein described.

55,205.—Apparatus for Preparing Peat.—Samuel Marden (assignor to himself and Dustin Lancey), Newton, Mass.:

First, I claim the combination and arrangement of the corrugated or grooved breakers, q, in connection with the perforated bowl at the bottom of the hopper, substantially as and for the purpose specified.

Second, I claim the revolving chambered cylinder, x, combined with the compressing plunger, u, and the expelling plunger, l', substantially as and for the purpose specified.

Third, I claim the combination of the lever, d', the pitman, J, the tripping lever, l', and the vertical slider or actuator, e, connected with the cylinder, x, as above arranged and described.

Fourth, I claim the combination and arrangement of the forked lever, q', as connected with the frame, A.

55,206.—Potato Digger.—F. M. Morley, New York City, assignor to himself and J. W. Mount, Medina, N. Y.:

First, I claim a rotating cylindrical screen, F, entirely open through its center and free from obstructions, in combination with the digger or shovel, E, substantially in the manner and for the purpose set forth.

Second, I claim the combination of the shovel, E, frame, a, and crank axle, N, substantially in the manner and for the purpose described.

Third, I also claim the standards, O, having rotative adjustment on the crank axle, N, to regulate the depth of digging, substantially in the manner and for the purpose specified.

Fourth, I also claim the combination of the shovel, E, frame, A, and pivoted draft pole, C, substantially in the manner and for the purpose set forth.

55,207.—Carpenters' Plane.—George Muller (assignor to himself and Henry Joseph Bang), New York City:

I claim the sliding box, E, with clamping screw, I, and the forked prize piece, F, in combination with the cup plate, D, and bit, C, together with planing the same in the throat, a, or forward end of the plane stock, substantially as and for the purposes set forth and described.

55,208.—Clothes Dryer.—William W. S. Orbeton, Haverhill, Mass., assignor to himself and George W. Campbell, Bradford, and George P. Russell, Haverhill, Mass.:

I claim the combination of the wheel, A, the adjuster, D, the pulley, S, the posts, E and F, or their equivalents, and endless line, o, with the levers, b, and its rope, r, the whole being arranged so as to operate as and for the purpose set forth.

I also claim the adjuster, D, constructed substantially in the manner as set forth, and provided with a clamping screw and nut and a journal, d, respectively applied to the post, H, and wheel, A, the whole being arranged in manner, and so as to operate substantially as set forth.

55,209.—Machine for Turning Boiler Flanges.—Edward Paye (assignor to himself and Cornelius H. Delamenter), New York City:

First, I claim the use, in a machine for turning boiler flanges, of a series of hammers, F', acted upon by a cam, b, so that the flanges are turned by a series of blows, as set forth.

Second, Making the hammers adjustable on their shanks by means substantially as herein described, or any other equivalent means, so that the machine can be adjusted for flues of different diameters.

Third, The arrangement of a revolving cam, and cam grooves in combination with the hammers, F, said hammers being constructed and operating substantially as and for the purpose described.

Fourth, The arrangment of a center in the bottom ring, l, substantially as and for the purpose set forth.

Fifth, The clamp composed of two rings, u l, in combination with the hammers, F', constructed and operating, substantially as and for the purpose described.

Sixth, The cam levers, w, in combination with the rings, l and u, and with the swivel bar, r', constructing and operated, substantially as and for the purpose set forth.

55,210.—Stove Pipe Thimble.—James F. Severance (assignor to himself, Eleazer C. Bennett and Oliver H. Wade), East Bridgewater, Mass.:

I claim the arrangement and application of two or any other suitable number of adjustable slides, C C, made substantially as set forth, or their equivalents, with the pipe thimble composed of the plate, A, and the tube, B.

I also claim the combination and arrangement of the cover, F, with the pipe thimble and its adjustable slides, C' C', applied to it in manner and so as to operate, substantially as specified.

I also claim the combination and arrangement of the damper with the pipe thimble and the adjustable slides thereof.

I also claim the combination of the damper, the pipe thimble, the adjustable slides, with the cover, the whole arranged substantially as specified.

55,211.—Mode of Driving Spindles in Spinning Frame.—James Sutherland (assignor to himself and Joseph M. Mumford), East Hampton, Mass.:

I claim the combination of the drum, A, spindles, a a b b, and bands, c c, the whole arranged and operating in the manner and for the purpose herein described.

55,212.—Drop Light Fixture.—S. B. H. Vance and E. M. Smith (assignors to Mitchel, Vance & Co.), New York City:

First, we claim the arrangement of an adjustable drop light, D, centrally between two or more curved pipes, B, of a stationary chandelier operating substantially as shown and described.

Second, The shield, r n, constructed and arranged in combination with the drop light, substantially as herein set forth for the purpose specified.

Third the non-conducting block, v, in combination with the drop light burner, b, and handle, E, substantially as herein set forth, for the purpose specified.

55,213.—Bending Fore and Aft Sails.—William Woodbury (assignor to himself and Mellen Bray), Chelsea, Mass.:

I claim the two jacket ropes, c d, in combination with the said, D, and mast hoops, a, arranged and operating substantially as set forth.

I also claim, in combination with the above, the rings, l, or their equivalents, operating substantially as and for the purpose described.

55,214.—Medical Compound.—Ellen V. Conway, (executrix of the estate of James H. Conway, deceased,) Richmond, Va.:

I claim the compound or cough mixture, as herein described.

55,215.—Method of Attaching Shoes to Horses.—Thomas Henry Ince, Westminster, London, England:

I claim the mode herein described of attaching a horse shoe by screws, whose heads shall be sunk within the body of the mental, as shown and described, and which penetrate the hoof in a direction parallel, or nearly so, with the outer wall thereof, but without piercing the latter.

55,216.—Preserving Timber—Frederick Ransome, Ipswich, Kingdom Great Britain:

I claim treating timber for the purpose of preserving the same with a solution of silicate of soda or potash, and afterwards with a solution of chloride of calcium or other soluble salt of an alkaline earth or chloride of aluminium or iron, substantially as described.

55,217.—Cigar Machine.—G. Albert Reiniger, Stuttgart, Kingdom of Wurtemburg:

First, I claim the adjustable screw clamp, d, in combination with the flexible apron, b, and table, A, constructed and operating substantially as and for the purpose described.

Second, The spring hook, j, in combination with the table, A, apron, b, and roller, a, constructed and operating substantially as and for the purpose specified.

55,218.—Feed Water Injector.—John Robinson and James Gresham, Manchester, Great Britain:

We claim injectors where the internal nozzles, e' and f' are actuated by a toothed rack and pinion, and are arranged and combined with the external nozzle, e and f, and the steam nozzle, c, substantially as hereinbefore set forth.

REISSUES.

2,257.—Machine for Pressing Bonnets, Bonnet Frames, Etc.—W. E. Doubleday, Brooklyn, N. Y., and J. Stewart, NewYork City (assignees by mesne assignment of William Osborn, deceased). Patented Aug. 19, 1854. Reissued Feb. 17, 1857. Again March 27, 1860:

First, I claim manufacturing, stretching, or shaping, by means of heated dies, the whole of the bonnet fram (or similar article to be worn upon the head), at one operation, substantially as specified.

Second, Manufacturing by stretching, forming or shaping, by heated dies, the flaring face piece and side crown, of a bonnet, or similar article to be worn on the head, jointly at one operation, substantially as specified.

2,258.—Manufacture of Spoons.—Charles Parker and Russell B. Perkins (assignees of Russell B. Perkins), Meriden, Conn. Patented April 1, 1862:

We claim a spoon, the bowl and handle of which are united, substantially as described.

2,259.—Harvester.—Lewis E. Reese, Phillipsburgh, N. J. Patented April 10, 1860:

First, I claim the combination, with a series of revolving, rising and falling rake and reel arms, pivoted to a rotating shaft, from which they derive their motion, of a guide which so controls the motion of the rake arms as to cause them to descend into the standing grain in advance of the finger beam, to press the grain back against the cutting apparatus, to sweep across the platform, and discharge the gavel at the rear end thereof, and then to rise and move forward in an elevated position out of the way of the falling grain, without projecting beyond the stubble side of the machine, and leave an unobstructed space on the machine upon which the driver may ride.

Second, A combined reel, and rake with its arms so constructed that they shall have a revolving motion around their shaft, and a rotating motion around their own axes, for the purpose of turning their teeth downward when raking off, and upward when moving forward.

Third, The combination of the rake arms with the guide by means of the overlapping projections, stays or rods, i, substantially in manner described, for the purpose of holding the rake to the guide during its entire circuit.

Fourth, The combination of a revolving rake having its arm hinged to its shaft at the inner end with a guide located between the rake head and its pivot, whereby I cause the rake to descend into the uncut grain in advance of the finger beam, to press the stalks back against the cutting apparatus, to sweep across the platform in a horizontal circular path, and discharge the gavel, and then to rise and move forward in an elevated position out of the way of the falling grain, without projecting beyond the main frame, or passing over the head of the driver.

2,260.—Horse Hay Fork.—Seymour Rogers, Pittsburg, Pa. Patented Jan. 24, 1865:

First, I claim in hay elevators which combine a penetrator and rod with a barb or barbs, attaching such barb or barbs to the rod or lever by which they are operated, substantially as herein described.

Second, So constructing the hay elevator, substantially as herein described, as that the rod or lever to which the movable barb or barbs are attached, or are set and discharged shall serve as the handle by which the elevator is suspended and supported.

Third, The notches, e and f, in the rod, D, in combination with the cap, C, and the cam, H, substantially as and for the purpose herein before set forth.

2,261.—Car for Transporting Petroleum.—James and Amos Densmore, Meadville, Pa. Patented April 10, 1866:

First, I claim the two tanks, B B, or their equivalents, when constructed and operating in combination with an ordinary railway car, substantially as and for the purpose set forth.

Second, The two tanks, B B, or their equivalents, when set directly, or nearly so, over the car trucks, and when constructed and operating in combination with an ordinary railway car, substantially as and for the purpose set forth.

Third, The frame, C C C C, the bolts 1, 2, 3, and 4, and the cleats, H H H H, when constructed and operating in combination with tanks, B B, and an ordinary railway car, substantially as and for the purpose set forth.

Fourth, The steps, F F, the manholes and man heads, D D, the fanceis, E E, and the run-way, G, when constructed and arranged in combination with tanks, B B, and an ordinary railway car, substantially as herein set forth and described.

DESIGNS.

2,324.—Trade Mark for Lead Pencils.—Lemuel H. Flersheim, Chicago, Ill.

2,324.—Pitcher.—Ernest Kaufman, Philadelphia, Pa.

2,325.—Spoon or Fork Handle.—G. I. Mix, Wallingford, Conn.

2,326.—Cook Stove.—George T. Spicer, Providence, R. I.

2,327.—Chandelier.—James F. Travis (assignor to Mitchell Vance & Co.), New York City.

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CONNER'S SCREW WRENCH.

That so simple an implement as the common screw wrench should be made the subject of a number of patents, is perhaps surprising; but whenever strength and facility of handling can be secured by an alteration, such alteration is an improvement and is worth patenting. The implement now under consideration appears to be a strong and well-made article. It is fully described below.

This improvement consists in forming with the hub or outer jaw of the wrench, and projecting at right angles from its inner face, a hollow cylindrical tube having a slot extending the whole length, in which slides and is guided the movable jaw.—The heel of the movable jaw is made in a tubular shape, and fits in the said cylinder.

In the engraving, A represents the outer jaw, and B the inner jaw. C is the handle; D the screw that moves the inner jaw. The shank of the screw, D, is rigidly secured to the handle, C. A screw thread is cut through the inner portion of the movable jaw, through which the screw, D, passes, and by which it is moved. The end of the screw passes through the outer jaw and is allowed to turn freely in position, so that the inner jaw is readily moved back and forth on the screw.

This invention was patented February 6, 1866, through the Scientific American Patent Agency by T. J. Hennessey, to whom it was assigned by J. C. Conner, the inventor, before the issue.

Further information may be obtained by addressing Mr. Hennessey, No. 81 Beaver street, New York.

Remarkable History of a Torpedo Boat.

General Maury's report of the defence of Mobile narrates the eventful history of a torpedo boat as follows:—"It was built of boiler iron, was about 35 feet long, and was manned by a crew of nine men, eight of whom worked the propeller by hand. The ninth steered the boat and regulated her movements below the surface of the water. She could be submerged at pleasure to any desired depth, or could be propelled upon the surface. In smooth still water her movements were exactly controlled, and her speed was about four knots. It was intended that she should approach any vessel lying at anchor, pass under her keel, and drag a floating torpedo, which would explode on striking the side or bottom of the ship attacked. She could remain submerged more than half an hour without inconvenience to her crew. Soon after her arrival in Charleston, Lieut. Payne, of the Confederate navy, with eight others, volunteered to attack the Federal fleet with her. While preparing for their expedition the swell of a passing steamer caused the boat to sink suddenly, and all hands, except Lieut. Payne, who at the moment was standing in the open hatchway, perished. She was soon raised and again made ready for service. Lieut. Payne again volunteered to command her. While lying near Fort Sumter she capsized and again sunk in deep water, drowning all hands except her commander and two others. Being again raised and prepared for action, Mr. Aunley, one of the constructors, made an experimental cruise with her in Cooper River. While submerged at great depth, from some unknown cause, she became unmanageable, and remained for many days at the bottom of the river with her crew of nine dead men. A fourth time was the boat raised, and Lieut. Dixon, of Mobile, of the 21st Volunteers, with eight others, went out of Charleston harbor in her, and attacked and sunk the Federal steamer *Housatonic*. Her mission at last accomplished, she disappeared forever with her crew. Nothing is known of their fate, but it is believed they went down with the enemy."

EVANS'S WEATHER STRIP.

This invention relates to an attachment which may be readily adjusted to the sills or lower portions of French window or door frames, so as to prevent wind or rain from passing under the sash or door, as shown in Fig. 1, in which A represents a strip rabbeted or grooved upon the under side, which is fitted to a tongue or projection upon the upper side of the sill, as shown in the transverse view, Fig. 2. At the outer edge of the strip is a rabbet or projection, extending up a suitable distance above the lower edge and outside of the sash, C. When it is desired to close the joint underneath the sash, the eccentric lever, D, is turned up, which brings the eccentric portion of the lever against the upper side of the sill, which raises the strip against the bottom of the sash and the rabbeted portion snugly against the inside of the sash, thus rendering the joint proof against wind and rain. These attached strips may be made of either wood or

Fig. 1

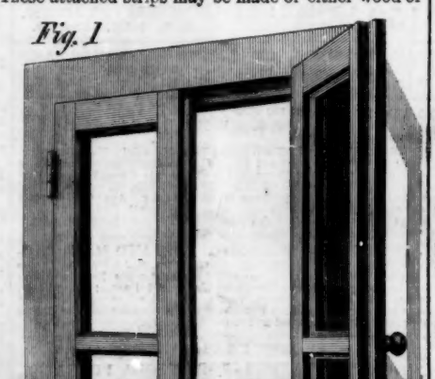
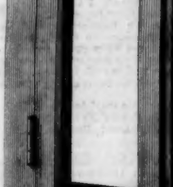


Fig. 2



metal, and when properly constructed, will be found of vast benefit to those who use the casement window.

Rights for the sale and use of this invention may be obtained of Edmund C. Evans, Cabinet, Pa. It was patented March 13, 1866. [See advertisement in another column.]

RYERSON'S CHURN.

This invention consists in the combination and arrangement of gear wheels with the dasher of a churn and their supports.

In the accompanying engraving, Fig. 1 is an end elevation, and Fig. 2 a side elevation of the same. A represents the barrel of a churn, of common construction, upon the top of which is secured by means of hooks and eyes, the cover to which the supporting frame, G, and inclined guides or braces, A A are attached. To this frame, G, are attached the spur or driving wheel, B, which meshes into a corresponding pinion, C, both of which run in suitable bearings. Upon the inner end of the shaft of the pinion, C, is a crank wheel, O, to which is attached the pitman, I, which is connected to the upper end of the dash handle, E. The pitman may be connected at any point of the dasher handle, E, and adjusted to any desired position by means of thimble or band and set screw, J. At the outer end of the shaft of the spur wheel, B, is a crank, H, by which the churn is operated.

Fig. 2

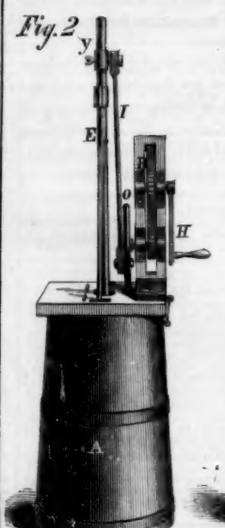


Fig. 1

It is claimed by the inventor that this churn is easy, rapid, and perfect in its operation.

The invention was patented Feb. 27, 1866. Further information may be obtained by addressing the inventor, Ira J. Ryerson, Box 30, Princeton, Ind.

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